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Master's Thesis
Academic Year 2023

Yu: A Set of Physical and Mobile-Based
Platforms for Delivering and Sharing Olfactory
Memories



Keio University
Graduate School of Media Design

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A Master's Thesis
submitted to Keio University Graduate School of Media Design
in partial fulfillment of the requirements for the degree of
Master of Media Design

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Abstract of Master's Thesis of Academic Year 2023

Yu: A Set of Physical and Mobile-Based Platforms for
Delivering and Sharing Olfactory Memories

Category: Design

Summary

The sense of smell is closely related to human memory and plays a crucial role in forming olfactory memory. The lived experience of wearing a mask has led to an increased appreciation of the importance of the sense of smell.

Based on the odor collection kit, this design aims to create a more diverse platform for collecting odor-evoked memories. The design provides a solution for people to combine and perpetuate their sense of smell with memories in various ways and helps to share them with others easily. At the same time, the design's categorization and labeling functions allow users to form a concise management system and a visual map to awaken their awareness of olfactory memories. In addition, the application also demonstrated through multiple rounds of user simulation tests that people's olfactory narratives can essentially stimulate the emotional resonance of others, resulting in better memory effects and recall experiences. "Yu" aims to create a platform for users to share their memories in a private and connected method with friends and family.

Keywords:

olfactory interfaces, proustian memory, odor, scented products, autobiographical memories

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Contents

Acknowledgements	viii
1 Introduction	1
2 Literature Review and Related Work	3
2.1. Background	3
2.1.1 Principles of Olfactory System	3
2.2. The Roles of Odors in Memory Processes	5
2.2.1 Encoding and Neural Connectivitys	5
2.2.2 Emotional and Associative Factors	6
2.2.3 Neuroplasticity	7
2.2.4 Sensory Integration and Contextual Memory	8
2.3. Previous related work	9
2.3.1 Odor-evoked Memories Generator	9
2.3.2 Emotion affector	11
2.3.3 Behavioral influencing factor	12
2.3.4 Spatial Information Connector	13
2.4. Research Gap	14
3 Product Design	16
3.1. Inspiration	16
3.2. Preliminary Survey	18
3.3. Physical Kit: Odor archive kit design	20
3.3.1 Design concept	20
3.3.2 Raw material selection	21
3.3.3 Kit naming	22
3.3.4 Logo design	23

3.3.5	Usage process	26
3.3.6	Hypothesis	27
3.3.7	Rationality of the Scent Kit 'Yu'	27
3.3.8	Discussion	34
3.4.	Online Application: Odor-evoked memory sharing platform	35
3.4.1	Target User	35
3.4.2	Design Process and Wireframe	36
3.4.3	Design Paradigm	38
3.4.4	Design Elements	39
3.4.5	User Test	49
3.4.6	Online Simulation Test	61
4	Conclusion	69
4.1.	Main findings	69
4.2.	Future application	70
	References	72
	Appendices	76
A.	Preliminary Survey	76
B.	Application Survey	77
C.	Initial Survey for the application	78
D.	Online Simulation Survey	81

List of Figures

2.1	A schematic diagram of the relationship among olfactory perception, encoding, and retrieval	4
2.2	Smell Memory Kit	9
2.3	Machanism of 'KAORIUM'	10
2.4	Guidance of selecting scented candles	11
2.5	How olfaction promotes well-being through nutrition and social behavior	12
2.6	Fragrance extracted from mominoki grown in Hokkaido	13
2.7	A smell map of a block in New York City.COURTESY KATE MCLEAN	14
3.1	Sensory camera	17
3.2	The column chart <i>Respondents' answers to the Question asking their preferences on senses, regarding the long-lasting impression</i>	19
3.3	Question: <i>Do you prefer a scent because of an excellent related memory?</i>	19
3.4	(a) responses by people's opinion toward odor-evoked memory .	20
3.5	(b) responses by people's preference and recognition of odor-evoked memory	20
3.6	Inspiration source and mood board of Yu	22
3.7	The Japanese word of 'Amalgamation'	23
3.8	Logo in process	24
3.9	The logo for scent archive kit 'Yu'	24
3.10	The Japanese word of 'Amalgamation'	25
3.11	The word cloud generated by answers	28
3.12	The scented emission system at ceremony	30
3.13	The prototype of 'Yu'	31

3.14	The wireframe of 'Yu'	36
3.15	The wireframe of 'Yu'	37
3.16	Reference Board	40
3.17	Login Page	41
3.18	Homepage	41
3.19	Personal Archive	43
3.20	Map and Pin	43
3.21	Login Page	44
3.22	Homepage	44
3.23	Feed	45
3.24	DM Function	45
3.25	Search and Categories	47
3.26	Friend Request	48
3.27	Hide the Post	48
3.28	A Week 1	52
3.29	A Week 2	52
3.30	B Week 1	52
3.31	B Week 2	52
3.32	C Week 1	53
3.33	C Week 2	53
3.34	D Week 1	54
3.35	D Week 2	54
3.36	E Week 1	55
3.37	E Week 2	55
3.38	F Week 1	56
3.39	F Week 2	56
3.40	Result: Satisfaction Level	56
3.41	Result: Olfactory Cues	57
3.42	Result: Memories evoked	57
3.43	Result: Construct Memories	58
3.44	Result: Curiosity	58
3.45	Result: Willingness to share	60
3.46	Result: How comfortable do you feel to share the contents	60

List of Figures

3.47	Example question	64
3.48	Simulation Test Survey	65
3.49	Answer of Example Question	66
3.50	The correlation between product design and user experience . . .	67
3.51	Overall evaluation	68

List of Tables

3.1	High Frequency Vocabulary	29
3.2	Descriptions from different groups	29
3.3	Results of the survey (percentage)	33

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Chapter 1

Introduction

In light of the diverse range of scented products available and the significance of scents in various environments, individuals' concerns and perceptions are often closely tied to scent-related experiences. However, a study examining commercially available scented products reveals that the majority of these products primarily emphasize the scent itself rather than focusing on establishing an emotional connection between the scent and specific audience groups.

This design aims to explore the concept of emotional design by considering individuals' olfactory senses and the memories evoked by scents, ultimately aiming to create products that instill consumer confidence. By leveraging the powerful emotional impact of scent and its ability to evoke memories, this tool seeks to provide individuals with a means to document and preserve aromas encountered during their journeys. The design process focuses on incorporating emotional elements that resonate with users, fostering a deeper connection between scent, memory, and their overall travel experiences. The product aims to enhance users' engagement and satisfaction through this approach, ultimately leading to a more meaningful and fulfilling interaction with scent-related products.

A qualitative research method was used to study the target group through an initial questionnaire and a follow-up survey of the experimental group. The analysis led to the conclusion that good environmental scents can enhance people's memory and satisfaction with travel details to a certain extent. Meanwhile, the "Longevity" and "Proust effect" of the product can prolong the sense of joy. This makes people's memories of the travel process more distinct and three-dimensional, filling the gap in visual memories such as photos and images.

It is worth mentioning that this product fills a gap in the market by comparing it with existing products and similar concepts on the market. Furthermore, unlike the traditional sense of having fixed scent products or souvenirs, this product has

more substantial flexibility to meet the user's personal initiative and can play the role of the user choosing what scent to establish an emotional connection. The online application also provides a way for people to share their memories.

Unfortunately, there are still limitations in the choice of materials and the technical exploration of how to maximize the restoration of scent. There is much room for development. However, it is the original intention of designing this product to explore and express users' implicit needs and to bring people a more pleasant living experience.

Chapter 2

Literature Review and Related Work

2.1. Background

2.1.1 Principles of Olfactory System

The olfactory system is responsible for processing and interpreting odor information. Understanding the principles underlying the functioning of the olfactory system is crucial for comprehending how it encodes and represents odor information. This section presents an overview of the key principles governing the processing of olfactory information in the olfactory system.

Olfactory Receptor Neurons (ORNs)

Olfactory receptor neurons, located in the olfactory epithelium, are responsible for detecting odorants in the environment. Each ORN expresses a specific olfactory receptor, which confers odorant selectivity. Odorants bind to these receptors, initiating a cascade of biochemical events that result in the generation of electrical signals.

Olfactory Bulb

The olfactory bulb receives input from the ORNs and serves as the initial processing site for olfactory information. In the olfactory bulb, glomeruli are organized in a spatially segregated manner, representing specific odorant receptors. Convergence and lateral inhibition mechanisms shape the olfactory bulb's output, resulting in odorant-specific activation patterns.

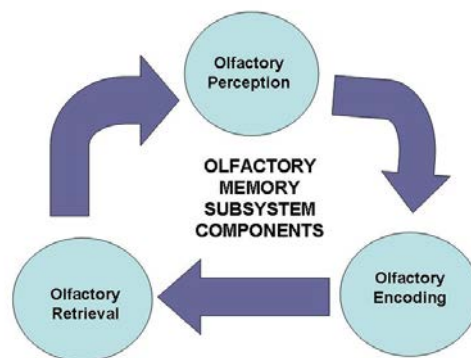
Olfactory Perception

The pattern of activation in the olfactory bulb is further processed in higher brain regions, including the piriform cortex and the orbitofrontal cortex. These regions integrate olfactory information with other sensory inputs and contextual

cues, contributing to the perception and recognition of odors [?].

Olfactory Memory

The olfactory system's close connection with brain regions involved in memory formation, such as the hippocampus and amygdala, plays a crucial role in olfactory memory. Olfactory cues can evoke strong and emotional memories due to the direct connections between the olfactory system and limbic structures [1].



(Source: Olfaction and Memory - Scientific Figure on ResearchGate.)

Figure 2.1 A schematic diagram of the relationship among olfactory perception, encoding, and retrieval

Plasticity and Adaptation

The olfactory system exhibits remarkable plasticity, allowing it to adapt to changes in the odor environment. Sensory experience and learning can lead to synaptic modifications and changes in odor representations. Adaptation mechanisms enable the system to maintain sensitivity to new odorants while disregarding persistent or background smells.

In conclusion, the olfactory system processes odor information through a series of stages, from detecting odorants by olfactory receptor neurons to integrating and interpreting olfactory cues in higher brain regions. Understanding the principles of olfactory information processing enhances our comprehension of olfaction's fundamental mechanisms and its role in perception and memory.

2.2. The Roles of Odors in Memory Processes

The link between olfaction and memory has long been a subject of scientific investigation. Numerous studies have demonstrated a robust association between olfactory information and memory recall. This section explores the underlying mechanisms and theories that explain why olfaction plays a crucial role in memory processes.

2.2.1 Encoding and Neural Connectivity

During the process of memory formation, olfactory information is encoded in the brain through the activation of specific neural pathways, establishing connections with memory-related brain regions such as the hippocampus and amygdala. This connectivity facilitates the integration of olfactory information with other sensory inputs, thereby enhancing memory encoding [2,3].

In the context of spatial coding and navigation, the role of olfactory cues is noteworthy. Studies have demonstrated that odors can serve as effective landmarks for spatial localization and memory [4,5]. The olfactory system contributes to the formation of spatial representations through its connections with brain areas involved in spatial processing, such as the hippocampus and entorhinal cortex.

Recent research by Poo and colleagues [6] has investigated how the brain processes olfactory information in relation to spatial cues. They conducted an experiment involving six mice, observing their ability to locate a water source in a maze based on both the maze map and associated scents. Surprisingly, neural activity analysis revealed that the olfactory system plays a significant role in the mice's spatial navigation within the maze. The findings indicated that certain neurons in the mice's brains responded to odor stimuli, while others specifically responded to spatial cues. These neurons exhibited varying degrees of responsiveness to both odor and spatial information, suggesting a potential interconnectedness between these sensory modalities. These observations support the idea that olfactory responses and spatial associations can be linked through underlying neural mechanisms.

The study also suggests that odors function as valuable cues for differentiating and identifying specific environments. This finding underscores the brain's

automatic association of smells with particular locations. Although the experiment focused on mice rather than humans, mice rely more heavily on olfaction for spatial judgments compared to humans, who primarily rely on vision.

2.2.2 Emotional and Associative Factors

Olfactory stimuli have a unique ability to evoke emotions and elicit vivid memories. The amygdala, a key component of the limbic system, is involved in processing emotional experiences. Olfactory inputs can activate the amygdala, leading to the formation of strong emotional associations with specific odors. This emotional salience enhances memory consolidation and facilitates later retrieval [7, 8].

Scent researchers have conducted numerous experimental studies on the association between scent and mood. According to Herz, an expert in this field, odor-evoked memories have a distinctly emotive quality, making humans more likely to remember the past through scent-related experiences. Herz emphasizes the importance of autobiographical memories and emotional connections that scents can evoke, stating that our mental and physical well-being relies on them [9].

The positive impact of scents on people's lives is evident in their ability to enhance job performance, task completion, relaxation, and sleep quality. Neuroimaging studies by Herz (2004) and Neumann et al. (2020) have shown that pleasant smells can positively influence various aspects of human functioning [7, 10]. In one study, Herz (1997) controlled ambient odors during a word-memorization task and observed that participants' performance improved when the scent was linked to heightened emotion [1].

Empirical evidence further suggests that odors have a direct influence on mental states, affecting mood and cognition. They have also demonstrated potential for mitigating psychological issues, particularly in the realm of stress reduction [11]. Researchers are investigating subtle variations in emotional responses evoked by similar but distinct odors, aiming to refine our understanding of the nuanced effects of odors on human emotions and behavior [12].

2.2.3 Neuroplasticity

The olfactory system exhibits a high degree of neuroplasticity, allowing for continuous adaptation and learning. Olfactory experiences can induce structural and functional changes in the brain, promoting synaptic plasticity and the formation of long-term memories. The plastic nature of the olfactory system enables the integration of olfactory information into existing memory networks [13].

Since the introduction of the concept of the Proust effect, scholars have conducted extensive research on the properties of odors that trigger memories. Herz and Schooler [14] found that memories evoked in the presence of fragrances tend to be more emotionally charged compared to memories associated with visual or verbal cues, even when the contextual cues are held constant. This finding suggests that odor-induced memories possess a distinctive quality of “tracing back” to the original event. Importantly, this study provides initial evidence that natural memories evoked by odors are more robust compared to memories elicited by other cues [14].

It is worth noting that much of the existing research on the relationship between odor and memory has focused on participants’ ability to identify specific smells rather than their capacity to recall detailed information associated with the odors [15, 16]. Many of these studies have primarily investigated the rate at which detailed information is forgotten [17, 18].

For example, when examining the retention of verbal information over time, researchers often observe rapid forgetting within a short duration [18]. In contrast, the ability to recognize previously encountered odors exhibits only a slight decline over time, ranging from a few seconds [17] to even months [15], with minimal change in recognition accuracy. The persistence of odor recognition memory over extended periods may be attributed to physiological and neurological factors, as suggested by basic scientific research [19]. However, the exact mechanism underlying the enduring nature of odor recognition memory remains unclear and requires further investigation based on previous studies.

2.2.4 Sensory Integration and Contextual Memory

Olfaction serves as a powerful cue for contextual memory retrieval. Odors have the ability to evoke memories of specific situations, environments, or events. The integration of olfactory cues with other sensory information, such as visual and auditory stimuli, enhances the richness and specificity of memory recall [20, 21].

Sensory integration plays a crucial role in contextual memory retrieval, with olfaction serving as a potent cue for this process. Odors have the unique ability to trigger memories associated with specific situations, environments, or events. This phenomenon has been extensively studied in the field of cognitive neuroscience, providing empirical evidence of the close link between olfaction and memory.

Numerous studies have demonstrated the ability of odors to evoke vivid and detailed memories. For example, Herz and colleagues [7] conducted an experiment in which participants were exposed to different odors while viewing pictures. The results showed that the presentation of specific odors during encoding enhanced participants' subsequent memory recall for the associated visual stimuli. This finding suggests that olfactory cues can significantly contribute to the richness and specificity of memory retrieval, particularly in a contextual framework.

The integration of olfactory cues with other sensory information, such as visual and auditory stimuli, further enhances the memory recall process. By combining multiple sensory modalities, individuals can create more robust and multifaceted memory representations. Research by Rabin and colleagues [22] investigated the integration of olfaction and visual stimuli in memory recall. Participants were presented with visual scenes accompanied by congruent or incongruent odors. The findings revealed that congruent odor cues improved participants' memory performance, highlighting the facilitative role of sensory integration in contextual memory retrieval.

The neural mechanisms underlying the integration of olfactory cues with other sensory modalities have also been explored. For instance, the olfactory system has direct connections with brain regions involved in memory processing, including the hippocampus and amygdala. This connectivity allows for the simultaneous activation and integration of olfactory, visual, and auditory information during memory retrieval, leading to a more comprehensive and detailed recollection of past experiences.

2.3. Previous related work

Based on extensive research into scent and its application in product design and its influence on consumer behavior, a significant number of products have emerged that incorporate scent to evoke memories and shape behavior. To shed light on this topic, this chapter undertakes a comprehensive review of related studies that examine the diverse effects of scent on individuals' psychology and behavior, all intending to enrich people's experiences.

Furthermore, this part will introduce more detailed insights into the strategies employed to focus and coordinate these effects across different initiatives. It will also help identify the research gap and understudy areas for further study.

2.3.1 Odor-evoked Memories Generator

It is commonly known that scents trigger more emotive and vivid memories than other memory cues due to the Proustian memory effect. Cross-sensory is a current design trend, especially for products related to olfactory memory based on the Proust effect. For example, the smell memory kit launched by the research institute crisp, shown as figure 2.2 helps people recall certain events through "familiar smells" and strengthens their memories by correlating people's descriptions of scents [23].



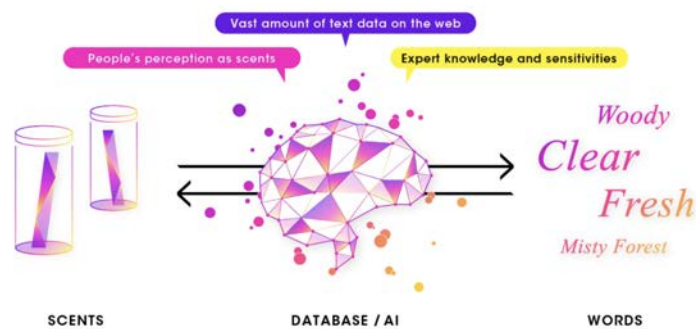
(Source: CRISP website)¹

Figure 2.2 Smell Memory Kit

The invention of the kit is based on the fact that people are driven by the associative power of scent under the influence of the Proust effect, which mobilizes the

brain’s limbic system for recall and elaboration. In experiments conducted in rehabilitation clinics, patients used the kit to facilitate sharing their life stories, also known as “health narratives”. In the process, the inventors realized that olfactory stimulation stimulates curiosity, the desire to narrate, and, more importantly, to share personal stories about scent.

Building upon the scientific foundation established by the aforementioned study and leveraging the data collection and analysis capabilities of artificial intelligence (AI), several scent-related products that aim to evoke impressions have emerged in the market. It is essential to clarify that these “impressions” are distinct from “memories” as they encompass instantaneous ideas and perceptions, and we do not delve into the discussion of whether they leave lasting effects or residuals.



(Source: Scentmatic Japan)

Figure 2.3 Mechanism of 'KAORIUM'

By associating different adjectives with corresponding fragrances, the product offers a convenient tool for consumers seeking to create specific impressions and atmospheres. This system’s underlying principle is further substantiated by previous research. A study investigating the relationship between olfactory cues and personality impressions found that the impressions and odors individuals generate during social interactions exhibit distinct gender-related manifestations [24].

2.3.2 Emotion affector

Scents also have an influential effect on people’s psychology and mood. People usually base their decision on the efficacy of a scent before choosing a product with a scent. Some manufacturers also describe the effects of their scented products, which are often positively associated with mood calming.

As a reference for consumers, the Candle Association has published a table of common scents on the market and their possible benefits.

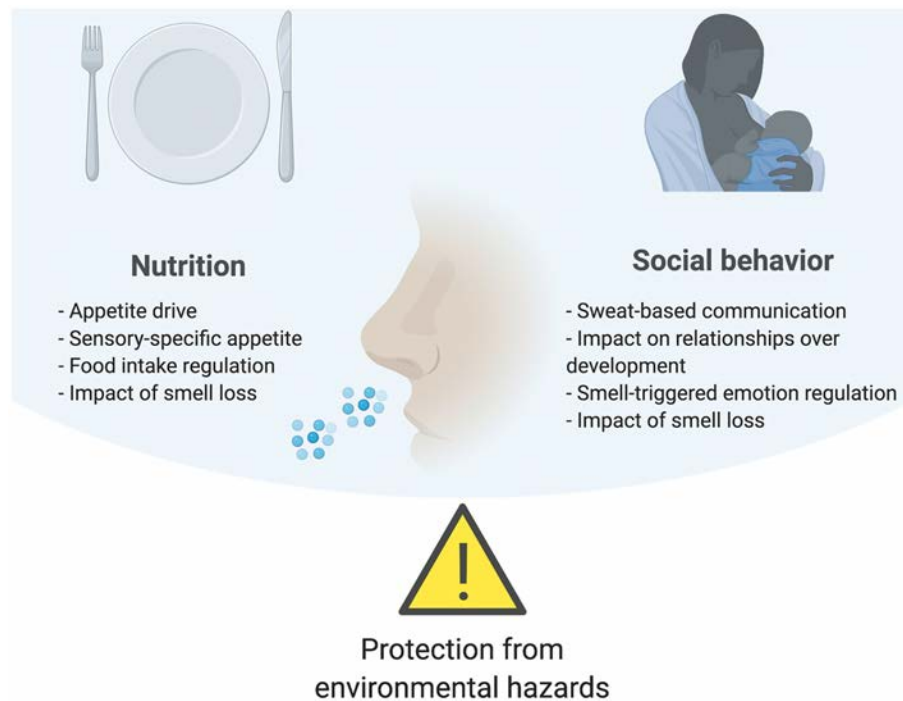
To Ease	Try
Anxiety	<u>Neroli</u> , Bergamot, Chamomile, Frankincense, Geranium (For Balance), Lavender, Orange, Patchouli, Rose (For Confidence), Sandalwood, Sweet Marjoram, Vetiver (For Grounding)
Disappointment	Bergamot, Cypress, Frankincense, Jasmine, Orange, Rose
Fear	<u>Cedarwood</u> , Fennel, Ginger, Patchouli, Sandalwood, Thyme
Grief	Bergamot, Chamomile, Jasmine, Marjoram, <u>Neroli</u> , Rose
Impatience	Chamomile, Clary, Frankincense, Lavender
Loneliness	Benzoin, Marjoram
Fatigue(emotional and mental)	Basil, Clary, <u>Cardamon</u> , Cinnamon Leaf Or Bark, Clove Bud, Coriander, Eucalyptus <u>Citriodora</u> , Ginger, Grapefruit, <u>Helichrysum</u> , Jasmine, Juniper, Orange, <u>Palmarosa</u> , Peppermint, Rosemary, Thyme, <u>Vetiver</u> , <u>Ylangylang</u>
Fatigue (physical)	Basil, Elemi, Ginger, Lemon, Lavender, Orange, Peppermint, Rosemary
Sadness	Benzoin, Jasmine, Rose, Rosewood
Stress	Bergamot, Atlas <u>Cedarwood</u> , Roman Chamomile, All Citrus Oils, Clary Sage, Frankincense, Geranium, Lavender, Sweet Marjoram, Melissa, <u>Neroli</u> , Patchouli, <u>Petitgrain</u> , Rose (Absolute And Otto), Rosemary, Sandalwood, <u>Vetiver</u> , <u>Ylangylang</u> .
Tension	Chamomile, Clary, Cypress, Frankincense, Geranium, Jasmine, Lavender, Lemon, Marjoram, <u>Neroli</u> , Orange, Rose, Rosewood, Sandalwood, <u>Ylangylang</u>

(Source: NCA website)²

Figure 2.4 Guidance of selecting scented candles

Although it is difficult to explain scientifically whether each scent can function in releasing negative emotions, according to Herz in the previous research: “odors that evoke positive autobiographical memories have the potential to increase positive emotions, decrease negative mood states, disrupt cravings, and reduce physiological indices of stress, including systemic markers of inflammation [9].” Good smells can help to relieve people’s physical and mental fatigue.

2.3.3 Behavioral influencing factor



(Source: The importance of the olfactory system in human well-being, through nutrition and social behavior)³

Figure 2.5 How olfaction promotes well-being through nutrition and social behavior

The sense of smell in humans plays a crucial role in various vital functions, including alerting and protecting individuals from environmental dangers, influencing eating behavior and nutrition [25], and facilitating social communication. However, the significance of the human sense of smell in promoting overall well-being is often underestimated. It has been observed that humans possess the ability to extract valuable nutritional information from olfactory cues associated with food [26]. These cues can evoke specific appetites and influence food choices, although their direct influence on actual food intake behavior may vary. In addition to its role in facilitating food enjoyment, the sense of smell also has the capacity to transmit and regulate emotional states, thereby exerting an influence on social relationships at different stages of life, including prenatal and postnatal

periods, puberty, partner selection, and during times of illness.

2.3.4 Spatial Information Connector

Similar to the findings from the previous experiments, the association between odors and specific locations in individuals is also rooted in the neuronal responses of the brain to scent and spatial cues [6]. Even before the elucidation of these research outcomes, product design in market behavior had already capitalized on individuals' physiological responses. In product profiles and design concepts, an abundance of location-related information and descriptions can be readily observed. The retrieval of scent-associated memories within individuals is achieved through the restoration of the product's fragrance, facilitating a connection to relevant locations.



(Source: Lofter)

Figure 2.6 Fragrance extracted from mominoki grown in Hokkaido

Another noteworthy study pertains to creating sensory maps, which involve recording olfactory information to establish associations between odors and specific locations. This endeavor, commonly referred to as a “smellwalk”, was developed by researcher Dr. Kate McLean. Through her explorations of the city, she documents the various scents encountered on different occasions, effectively

capturing the dynamic changes in the urban olfactory landscape. This project transforms imperceptible and ephemeral information into a visible archive, preserving it for posterity. Dr. McLean employs two approaches, namely “smell catching” (passively receiving odors) and “smell hunting” (actively seeking out less conspicuous scents), allowing her to capture both strong and subtle odor cues [27]. Detailed records are made regarding the intensity of the odors, any associated memories they evoke, and their duration.



(Source: Sensorymaps.com)⁴

Figure 2.7 A smell map of a block in New York City. COURTESY KATE MCLEAN

2.4. Research Gap

Despite extensive research from the perspectives of psychology, physiology, and behavioral economics, the replicability and transferability of olfactory memory have not been empirically supported. Therefore, after replicating odors themselves, it is

important to investigate whether combining them with memory descriptions can enhance a more three-dimensional and comprehensive impact on others' memories.

This is a nuanced topic, as previous studies have primarily focused on the effects of odor on oneself and the evaluations of others based on one's own odor. However, the question of whether odor can continue to elicit the same effects and emotional resonance in individuals through transference remains an important inquiry.

Furthermore, as mentioned in the introduction, our aim is to preserve and transmit memories through the medium of the product. This raises an intriguing consideration regarding the potential impact and informational value of various information cues, such as text, images, and sounds, derived from individuals' shared perception of smell, particularly in situations where individuals temporarily lose their sense of smell due to the side effects of COVID-19. This prompts us to reflect on whether these cues can evoke positive or negative effects when olfactory cues cannot be received [9].

Therefore, it is necessary to further investigate in future studies whether various information cues extracted from olfactory memory can directly influence others.

Chapter 3

Product Design

Based on a comprehensive review of the relevant literature and previous research, it is evident that olfactory studies have predominantly focused on group-based correlations, such as age and gender, and have primarily relied on direct assessments of participants' responses to odors themselves. Although these studies have shed light on the relationship between sensory perception and behavioral responses, it needs to be discussed more to explore the potential of converting odors into other symbols for information transmission and eliciting synesthetic effects.

The primary objective of this study is to delve deeper into the prospect of symbolically representing odors to facilitate information transmission and evoke synesthetic experiences. Adopting this innovative approach aims to facilitate the conveyance of emotions and the sharing of memories in situations where direct transmission of odor signals may not be feasible. Specifically, this research aims to investigate the potential association between odors and alternative symbols, such as images, text, or other sensory cues, in order to enhance our understanding of nonverbal communication channels and their impact on daily experiences.

3.1. Inspiration

The design process was initially sparked by an MMS (Multimedia Messaging Service) from a childhood friend, which left a lasting impression. The message consisted of a photo showcasing a delectable stew and the line expressing a desire for the recipient to experience the aroma and fully appreciate the dish's deliciousness. This highlighted many everyday situations enriched by specific olfactory stimuli while prompting the need to capture the associated emotions and sensations.

Drawing upon this inspiration, during the second semester of the KMD, as the

picture3.1 shows, the author designed a device to comprehensively record various sensory experiences, aiming to capture individuals' memories and perceptions holistically. Throughout the ideation process, careful consideration was given to the device's functionality, incorporating features such as map marking and odor classification.



(Source: My previous homework in KMD)

Figure 3.1 Sensory camera

The addition of map marking functionality enables users to pinpoint specific locations and associate them with unique olfactory experiences. This feature provides a practical means for individuals to navigate their memories, effectively

linking scent-triggered recollections with spatial contexts. Furthermore, including an odor classification function enhances the device’s versatility by enabling users to categorize and organize recorded scents according to various criteria, facilitating efficient retrieval and analysis.

By combining the desire to capture sensory experiences, the need for spatial context, and the importance of scent classification, the design of this device aims to provide a comprehensive solution for recording and preserving multi-dimensional sensory memories evoked by odor. The subsequent sections will explore this design’s specific considerations, features, and potential applications.

3.2. Preliminary Survey

A small-scaled questionnaire was conducted before the kit’s design, which is detailed in Appendix 1.

The preliminary survey aimed to understand people’s perceptions of odor and their insight into odor-related products. The questionnaire was designed to investigate whether people have any experience with scent-related memories by using the scent of ordinary perfumes on the market as an entry point.

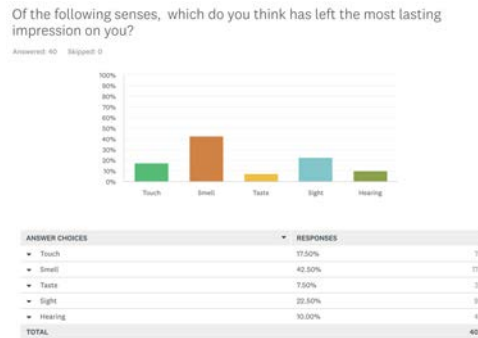
Below are the graphs of the results of the questionnaire.

First of all, when interviewing the respondents about their sensory experiences, according to the figure3.2, almost half of them chose “smell” as the sensory experience that they thought was impressive without knowing the purpose of the questionnaire.

The results that figure3.3 showed that 29 out of 40 people interviewed believed that pleasant memories create a preference for scent. We can assume that this scent is any scent, not necessarily a “good smell” as traditionally defined and that people will rely on it for the pleasant memories associated with it.

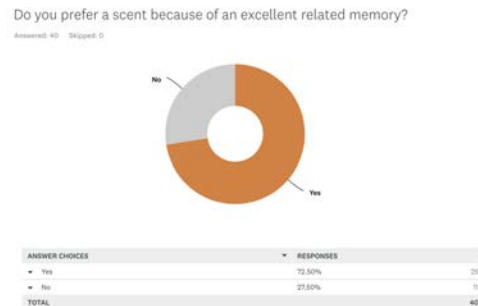
In addition, a large number of respondents showed their approval of odor-evoked memory, even though they were perhaps not explicitly aware of it before.

According to the results of the other questions, respondents generally believe that fragrance can make people better recall specific occasions and moments. When referring to the figures 3.4 and 3.5, respondents also believe that certain scented products can help people reactivate memories of their experiences.



(Source: Results from the preliminary survey)

Figure 3.2 The column chart *Respondents' answers to the Question asking their preferences on senses, regarding the long-lasting impression*

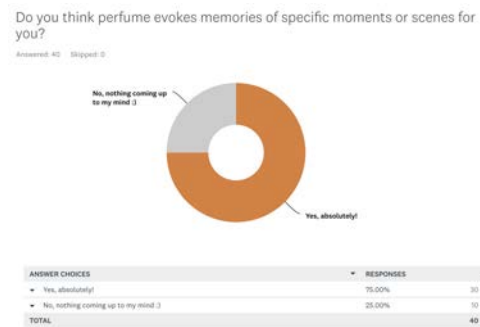


(Source: Results from the preliminary survey)

Figure 3.3 Question: *Do you prefer a scent because of an excellent related memory?*

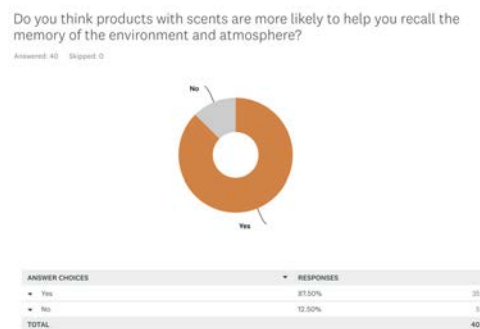
The open-ended questions often mentioned scents from nature, and respondents had a stronger preference and clearer perception of odors that were closer to nature, regardless of the occasion.

Based on the data, the design of the scent archive kit was able to continue.



(Source: Results from the preliminary survey)

Figure 3.4 (a) responses by people's opinion toward odor-evoked memory



(Source: Results from the preliminary survey)

Figure 3.5 (b) responses by people's preference and recognition of odor-evoked memory

3.3. Physical Kit: Odor archive kit design

3.3.1 Design concept

'Yu' is a portable memory archiving kit. Its name is derived from the Japanese word, meaning fusion and amalgamation which symbolizes the fusion of scent and air and the fusion of memories evoked by scent with the present time and space.

The Yu kit comprises wool and cotton blended fabric pads, a set of aluminum alloy assembled cases, and some labels. The fabric sheet is an odor absorber and

carrier, and the odor can be preserved for a long time in a stable, sealed aluminum box. After collecting the scent users want to preserve, they can combine it with other forms of memories (photos, text, images) to create more specific and vivid memories that can be shared.

3.3.2 Raw material selection

In the selection of materials, porous and soft materials with solid adhesion of odor molecules are used as target materials. Lots of the materials put into use on the market to absorb the smell do not have an odor-holding effect. Still, they are used as odor-cleaning products, such as odor-cleaning charcoal, odor-absorbing fabric, an absorbent article such as sanitary towels and diapers [28], nanosponge, and some other porous materials.

Due to the fiber's unique properties, wool garments and textiles are naturally resistant to odors, in this case, odors that the body itself may cause due to sweat and bacteria buildup. Wool can absorb and lock in possible odors during wear because the wool fibers actively hold the smell inside the fibers.

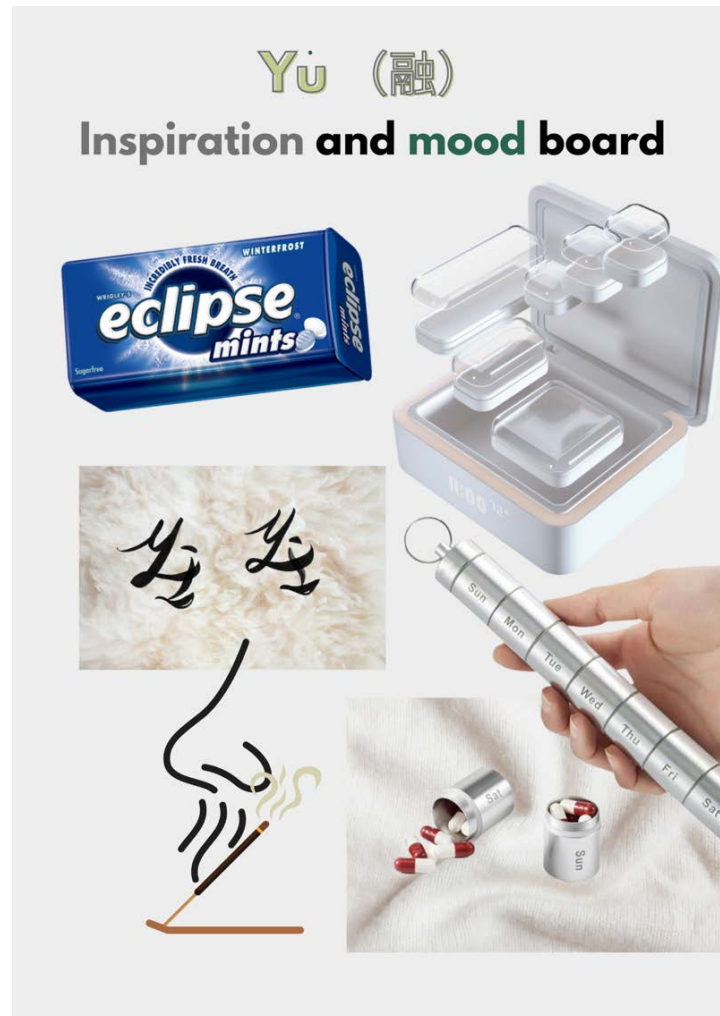
At the same time, wool fibers can absorb large amounts of water vapor - twice as much as cotton, thirty times more than polyester - helping to keep human skin dry while preventing moisture from changing the odor [29].

The effect of production, retention, and release of odor volatiles from fabrics remains relevant to the end user. Although current studies do not yet fully explain the mechanisms of adsorption, absorption, and release of volatiles, wool fabrics are known to perform well in this regard. Blending wool with cotton can potentially optimize the performance of cotton alone, for instance, skin-friendly abrasion resistance. And with 100 percent wool products, the potential for odor residue on garment textiles is significantly increased with the adoption of washing clothes at lower temperatures and under less water [30].

For the choice of container, the frequently purchased metal box of mints was the source of inspiration. These small metal boxes are usually made of aluminum alloy profile. Its qualities include lightness, excellent sealing, and moisture resistance, and the smell inside lasts a long time [31].

At the same time, considering that the odor archive kit may need to collect multiple scent samples, the container was designed as an aluminum product, like

an assemblable pill box. The mood board of the Scent Archive Kit 'Yu' clearly showed the kit's contents and where it was inspired; see figure 3.6.



(Source: Images collected from copyright-free websites)

Figure 3.6 Inspiration source and mood board of Yu

3.3.3 Kit naming

As explained in the previous part, the name of this odor archive kit is 'Yu'.

'Yu' is derived from the Japanese word 'Amalgamation'. See figure 3.7.



(Source: Japanese dictionary online)

Figure 3.7 The Japanese word of 'Amalgamation'

When we need to input this word in Roman, we need to type the Roman script as Yuu.

This is why a little dot is above the second 'u' in the name.

When abbreviating infinite loop decimals, we write a dot above the loop-ending number of the infinite loop decimal, which represents the string of numbers with no visible end.

Here, what cannot be seen to end is the smell that merges with the air. The odor-evoke memory, which interacts with the smell, also represents that memory can cross time and space and invisibly merge into people's lives.

Also, it can be pronounced as 'You' in English, representing the idea of wanting to share good memories with each other or with one's future 'self' through olfactory archiving.

3.3.4 Logo design

For the detailed inspiration mood board, please refer to Figure3.6.

The logo contains the name 'Yu', the shape of the scent, and the container, which reflects the interpretation and presentation of the product's function while ensuring integrity. During the design process, we tried to blend all the elements by adjusting the brush strokes' thickness, weight, and shape.

From figure3.8 to figure3.9, we can see the whole process of design from simple to complex and then complex to simplified.

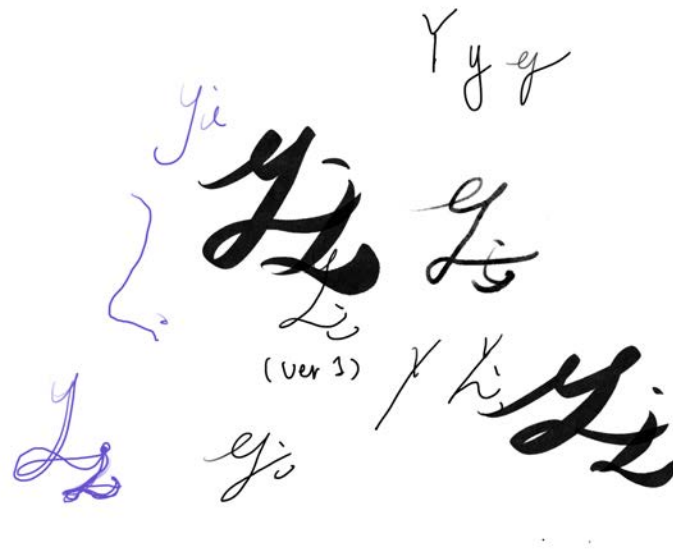
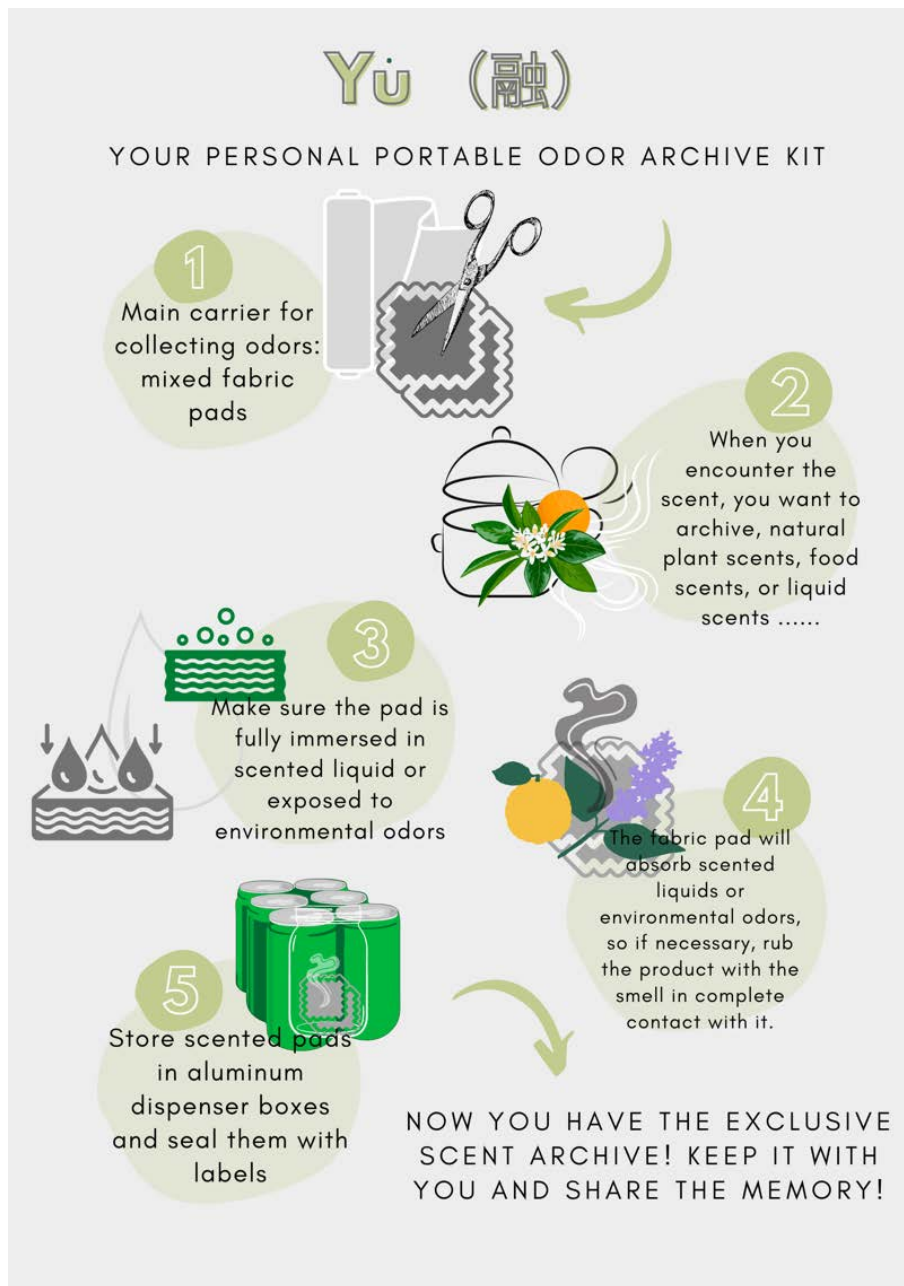


Figure 3.8 Logo in process



Figure 3.9 The logo for scent archive kit 'Yu'



(Source: Japanese dictionary online)

Figure 3.10 The Japanese word of 'Amalgamation'

3.3.5 Usage process

The poster of 'Yu', see figure3.10 demonstrates the principle and process of kit usage. The advantage is that it is simple, light, and easy to operate. Odor collection and acquisition can be done as much as possible, even under limited conditions.

Step1:Clarify the collection target

Before using it, the user needs to be clear about the odor he or she wants to collect and its source.

It should be noted that due to the volatility of the odor itself and the complexity of the different odor sources, here we only aim at odor retention over a short period of time (hours-2 days) as the goal of the study.

At the same time, for odors that may change over time, such as odors emitted by decaying liquids, or odors from synthetic liquids, such as perfumes, the collection results are equally likely to change. This is the change of odor due to the material change of the medium itself, which is an uncontrollable factor.

Step2:Adopt appropriate collection methods

For the odor carried by different media, the collection pad has the effect of direct absorption of liquids and gases, which has a more obvious effect. And for solids with odor, such as soap, candles, and other ready-made products, the odor can be made to adhere to the pad by repeatedly wiping.

Step3:Preserve the contents properly

Preservation of the odor is an essential part of the collection. We use the aluminum box in the kit to preserve the collection pad after it has absorbed the odor. For the best odor-blocking effect, we recommend using laboratory film to seal it. This professional sealing material can be used with 'Yu' as an option.

3.3.6 Hypothesis

By stating the purpose of the study and summarizing with the previous studies, after clarifying the purpose of the product and the problem that it wants to solve, we conclude our hypothesis as follows:

H1: Olfactory memory is reproducible, memories transmitted through olfactory cues are more accurate and vivid than mere graphic cues.

In an earlier study, scholar Herz confirmed that scent evokes emotions and memories related to oneself more easily than visual or verbal cues, suggesting that smell can influence the way we recall the past [14]. But what cannot be proven is whether the smell is different from the cues brought to people by other senses. At the same time, it is also worth exploring whether experiment results overlap in people's interpretation of the same odor.

H2: The textual cues extracted from olfactory memory can influence people positively or negatively, thus influencing their decision-making.

The experimental team designed nine scent emoticons and applied them to both text chat and voice mail reception. The results of the experiment showed that scent emojis help people perceive the emotions of others and that visual symbols also have an enhancing effect [32].

We hope that the scent archive kit 'Yu' serves as a direct scent message along with the text message extracted from it to see whether people will have mood swings and effects on it.

3.3.7 Rationality of the Scent Kit 'Yu'

Scene setting and odor collection

In this phase, questionnaires were used to collect occasions when people might be impressed. Compared to studies using existing odorants, questionnaires are able to collect many people's odors and also collect many unexpected scenes with odor descriptions.

Here are some samples:

I have been studying abroad for over 5 years, and I miss the odor of my Mom, my toys, my blanket, and everything related to home.

When the summer vacation in elementary school, playing a full day at home,

Table 3.1 High Frequency Vocabulary

Place	Object	When	Whom	Mood
Home	Perfume	Summer	Mom	Nostalgic
Birthplace	Detergent	Childhood	Ex	Sadness
Ceremony	Shampoo	Holiday	Friend	Chill
Street	Orange	New year	Stranger	Thrilled
Exhibition	Food	Alone	Parents	Calm

on the people associated with the smell and what happened at the time. And the illustrations that accompany physical contact can be more specific and cover more details.

The first experiment on memory transfer was designed and tested with ten participants, with subsequent refinements and modifications for unclear parts. The author, knowing in advance that a ventilation system would scent the ceremony, brought wool and cotton pads and an aluminum box and stayed on site with four other participants for 2 hours, then invited five other participants to watch the live broadcast online and five participants on site to describe the end of the ceremony and answer the following questions.

1. Please describe the end of the ceremony in as much detail as possible.
2. Ask each group of respondents to summarize how they felt watching the end.
3. Ask the interviewees watching the online broadcast to smell the collection pad with the smell of the scene and try to tell how they feel different from their previous answers.

Each participant's emotional response was randomized. The questioning was done in Chinese, and the recording was done in English. To ensure accurate understanding, the Chinese results of the questionnaire and the translated results were reviewed by two non-respondents who were skilled in bilingualism.

Table 3.2 Descriptions from different groups

On-site	Online
Touching, Wooden, Exciting	Good, Fine, Thrilled
Immersive, Sober, Déjà vu	Formal, Sandal, Memorable
Drifting, Enjoy, Content	Tears, Delighted, Punctual

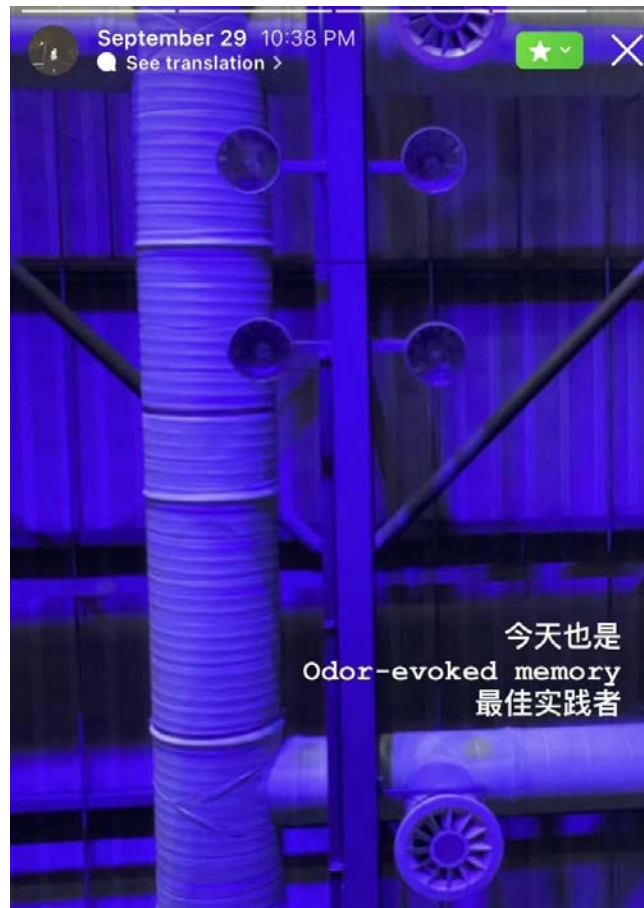


Figure 3.12 The scented emission system at ceremony



Figure 3.13 The prototype of 'Yu'

It should be suggested that respondents in the field had no specific preference for odors, avoiding bias in the results as much as possible due to the degree of preference for odors. In describing the composition of odors in the field, all three respondents in the field gave vague answers. In contrast to explicit types of scents, their descriptions appeared to use different words to describe odors with similar characteristics. For example, the participants suggested that the description of 'wood' may refer to different types of wood odors, such as burned wood and sandalwood, while the definitions of 'sandalwood' and 'wood' may refer to odors with similar odor characteristics.

There was also a clear bias in describing the ending scene between the two groups of respondents.

On-site

'When I closed my eyes, I felt like there was only me and the people on stage in the whole world, even though it was noisy around me.'

'When I look up, I can smell the scent of sandalwood blowing down from the ventilation ducts, and when no one is talking, it seems like I am holding an award ceremony in the forest.'

'The closing ceremony flowers and the shadows reflected on the walls made everything memorable for me, like a wedding in the woods.'

Online

'All the images were beautiful, and I felt very satisfied. But I don't know where you got the description about the forest from

'I've been to that venue for an event, and if the fragrance hadn't changed, I probably would have smelled that sandalwood scent, as if it was mixed with a floral scent? '

'The layout and lighting of the stage was beautiful. The purple ambient lighting was appropriate and felt luxurious. '

As can be seen, by the results, the memories described by the on-site group immersed in the scent are more likely to resonate with the scent. Both the description of the atmosphere and the explanation of the mood are better specific and vivid. The scent was tied to their memories and derived many scenes to get a fuller picture of the details.

On the other hand, the online group members could not resonate with the imagined derived scenes when the scent link was missing from their memories. The descriptions of the memories were more tangible, outputting what the eyes saw through words and focusing more on describing the visual impression of specific things when recalling the memories.

Next, the on-site group gave the collection pad containing the smell of the scene to the respondents of the online group. The end of the ceremony was replayed for the online group members and described again after re-watching while ensuring the same clip was played.

In the new round of descriptions, four respondents from the online group said that the same scent on the collection pad as the scene helped them feel the forest elements in their memories and that even though it was the same scene, the smell of the set made them watch the ceremony in a new state of mind. Another interviewee said that the scent of sandalwood made her feel calm, so she noticed more details that she hadn't noticed before, such as the host making a mistake during the ceremony and the presence of staff in the background.

This confirms our first hypothesis that scents continue to have the same impact and emotional resonance on people through continuity and transmission.

Results

After this, we refined the explanation of the product features and re-launched the questionnaire. The primary purpose of the questionnaire was to understand people’s preferences for souvenirs containing scents and whether they were intuitively influenced by the textual cues describing the scents.

A total of 144 valid responses were received, of which 33 were male, accounting for 23 percent of the total respondents, with another 109 female respondents and 2 choosing a non-binary gender. However, gender and self-perceived gender are not considered influencing factors for the results of this survey.

Respondents’ responses to the Yes or No question show a more pronounced polarization trend.

Table 3.3 Results of the survey (percentage)

Question	Yes	No
Have you ever wanted to keep a certain smell as a memory?	82.64	17.36
Do you have particular memories related to the odor you smelled?	72.56	27.44
Have you ever bought a scented souvenir?	57.64	42.36
Would you like to create your scent archive through 'Yu'	75.69	24.31

The vast majority of respondents indicated that they would like to collect and have memories related to scents. However, there was a slight fluctuation in buying scented souvenirs. The number of scent memory enthusiasts who chose 'no purchase' increased significantly, as a large amount of the off-the-shelf souvenirs are fixed scents that do not have strong memory associations and are more of a souvenir of a visit than a clue that can be directly linked to memories.

When asked to what extent existing souvenirs can help people evoke memories, the questionnaire took the form of a scale, with 'no relevant memories at all' as a score of 0 and 'Extremely vivid and clear' as a score of 5, by 144 Respondents made their choices according to their condition.

As a result, the most significant number of respondents, 28.47 percent, chose 'somewhat remembered' and could not recall the details, while those who chose 'no memory' and 'probably remembered' The number of respondents who selected 'no memory' and 'probably remember' was 27, accounting for 18.75 percent of the total respondents, respectively.

The average score for this question was 2.42, meaning that most respondents, despite having previously chosen a solid desire to build memories through scent, were dissatisfied with the existing souvenir. The reason is that collectibles with the smell of the time are more valuable for storage and sharing and can help them to recall, more specifically, the scene, the people around them, and the added pleasure of the scent.

Through the study, we also hope to obtain relevant conclusions about whether textual cues extracted from olfactory memory can have a direct impact on others. Therefore the questionnaire also asks whether, as a visitor, one cares about the smell of the environment or the evaluation of others related to the scent when choosing a place or attraction. The answer is obvious. More than half of the respondents showed varying degrees of concern in this regard, with nearly 70 percent of them indicating that they cared more about what others said about the smell of the environment or that it was an essential factor in their choice. Even if they do not personally experience the odor, negative comments about the environment or feedback about unpleasant experiences can significantly influence their decisions.

3.3.8 Discussion

This kit is designed to argue the proposed hypothesis through research and questionnaires, from design to experiments centered on exploring whether odor-evoked memory has a role and significance in perpetuating emotional values. Unfortunately, due to the limitation of the sample format, only common odor carriers (liquid or gas) were tested and investigated in this study. The results cannot adequately argue that the scent archive kit can still play its role in other forms of odor carriers and contexts to achieve better odor collection effects.

In researching how to make the scent last longer, it was widely mentioned that the procedure of making scented soap showed that adding some clay to the product can make the smell of oil-based fragrances last longer. However, it was proved to have little effect after a simple process of cleansing clay. Some manufacturers have experimentally demonstrated that they cannot confirm the anchor effect of clay on the scent [33].

Moreover, the emotional perpetuation effect of odor-evoked memory was corrob-

orated in the experiment. Although some individual respondents indicated that they did not feel any difference in the information received through the odors collected in the field, it is worth acknowledging that for most respondents, the information conveyed by the odors largely bridged the gap between visual and verbal communication.

The questionnaire results are consistent with prior learning from other scholars that odors impact people's psychology and that even the textual cues extracted from them may impact people's behavior or even decision-making [1].

3.4. Online Application: Odor-evoked memory sharing platform

Based on the background overview and relevant research studies, the phase 1 experiments conducted using the entity kit tool, and the elimination of real-life constraints, figurative scent-induced memories are found to be better supported under more realistic conditions. It is imperative to conceptualize a solution for establishing an information-sharing community due to the scarcity of platforms and functional options that acknowledge olfactory factors in existing markets and software. Individuals unconsciously receive a significant amount of olfactory information, and memories recounted in the presence of olfactory cues tend to yield more specific outcomes. Consequently, developing a mobile application dedicated to sharing olfactory memory information can provide a user-friendly platform for individuals inclined towards olfactory cues, allowing them to document cherished memories accompanied by olfactory information. Such an application would serve as a comprehensive alternative to compensate for the limitations of current information-sharing platforms.

3.4.1 Target User

The primary target audience of this study comprises individuals who exhibit a heightened sensitivity to olfactory information in their daily lives and consciously associate memories or recall experiences with olfactory cues and their figurative aspects. This audience encompasses individuals of various age groups, genders,

and ethnicities and is interested in information sharing. As indicated in a 2022 article, olfactory loss complicates the condition of 19-68 percent of patients with coronavirus, presenting symptoms that differ from those commonly observed in rhinitis patients. Typically, olfactory disturbances manifest as the initial symptom and persist for approximately two weeks. Medical professionals emphasize the need for some intervention for patients experiencing prolonged olfactory disturbances that do not resolve spontaneously. Daily therapeutic measures include exposure to non-stimulating environments that engage the sense of smell whenever possible. It made the design prove helpful as it allows individuals to share information and filter locations based on their preferences for specific occasions and scents.

3.4.2 Design Process and Wireframe

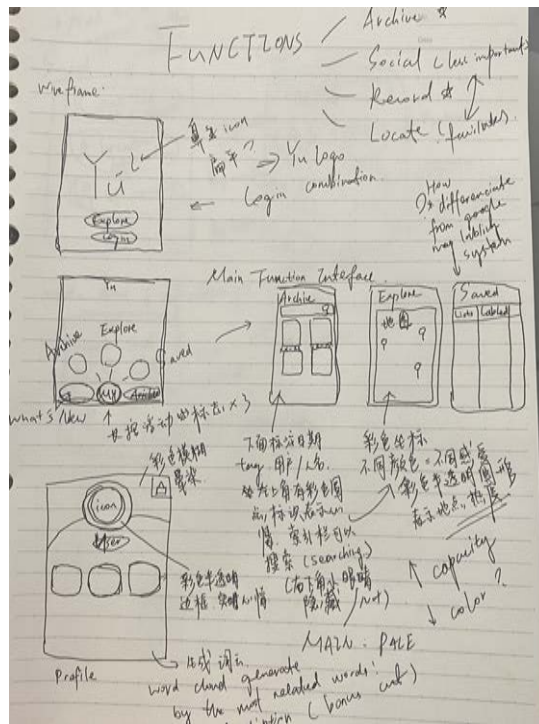


Figure 3.14 The wireframe of 'Yu'

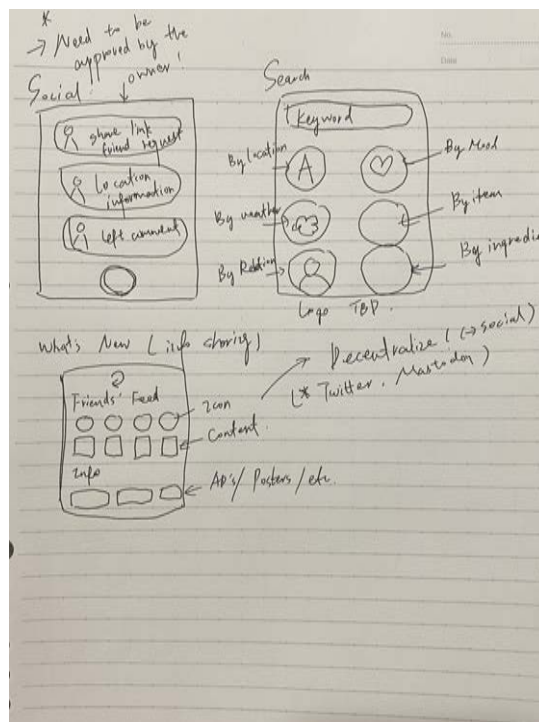


Figure 3.15 The wireframe of 'Yu'

After understanding the mechanisms underlying the olfactory system and odor memory and reviewing relevant literature and existing products, we identified a scarcity of social platforms that specifically integrate olfactory information and odor memory. In our initial phase, we conducted a questionnaire to assess the significance of olfactory information and gauge potential users' willingness to share their personal scent memories. Interviewees were asked to express their interest in olfactory preferences and scent memory experiences and their attraction toward scent-related descriptions of locations shared by others. Additionally, the questionnaire addressed the extent to which respondents would integrate odor-related information into their memories and narratives on a daily basis. Finally, respondents were queried about their platform preferences for information sharing and their willingness to disclose personal scent memories.

The collected data served as the basis for designing a user-friendly and intuitive platform, incorporating a decentralized architecture with lightweight social features. We aimed to ensure ease of navigation and seamless sharing of scent memories by employing an intuitive graphical interface and a streamlined user flow. Furthermore, innovative functionalities such as smell tagging and scent sharing were introduced, enabling users to describe and share their olfactory experiences using various mediums such as text, images, and audio recordings. Notably, the platform integrates a mapping feature, allowing users to create their own scent maps.

It is essential to highlight that user privacy and security are paramount considerations. Users are provided with the option to choose whether to share their scent memories publicly or keep them private. Privacy settings are offered to users, enabling them to control the extent of information they wish to share and whether their accounts are public or private.

3.4.3 Design Paradigm

The design paradigm of this platform revolves around a social platform based on olfactory information and odor memory. The fundamental principles of this design paradigm include simplicity and intuitiveness of user experience, personalization and customization options, social interaction, and privacy and security considerations. The user interface is designed to be user-friendly and intuitive, fo-

cusing on a clear layout and easy navigation. Personalization features allow users to customize the interface, layout styles, and display settings according to their preferences. Social interaction is facilitated through the ability to browse and engage with others' scent memories, including commenting, liking, and sharing. Privacy and security measures are implemented to protect user data, with users having control over the visibility and sharing of their scent memories. This design paradigm aims to provide users with a pleasant, secure, and meaningful platform for sharing odor memories.

3.4.4 Design Elements

This application focuses on enabling users to record and organize scent-related information at any time. It effectively integrates text, images, audio, and other media as carriers of sensory information and odor memories. Moreover, it provides a platform for users to share their scent memories in relation to specific spatial locations, facilitating lightweight social interaction. The author conducted an initial survey and created design sketches before selecting Sigma to showcase the application's user interface and sharing functionality. It is important to note that during the subsequent user testing phase, alternative platforms capable of receiving images, text, and other content were used as substitutes for collecting user profiles related to scent and contextual information.

Naming and Logo

This olfactory information-sharing application represents an evolved stage of tangible tools, incorporating the essence conveyed by the name 'Yu', which signifies immersing oneself in the sensory pleasure derived from odors and experiencing personalized emotional cues. On the mobile platform, in order to enhance visual aesthetics and interactive experiences, the initial design element of a dot has been transformed into a delicate wisp of smoke, symbolizing the presence of smell. This visual representation of smell takes on a tangible form, analogous to how individuals can conceptualize perceived odors.

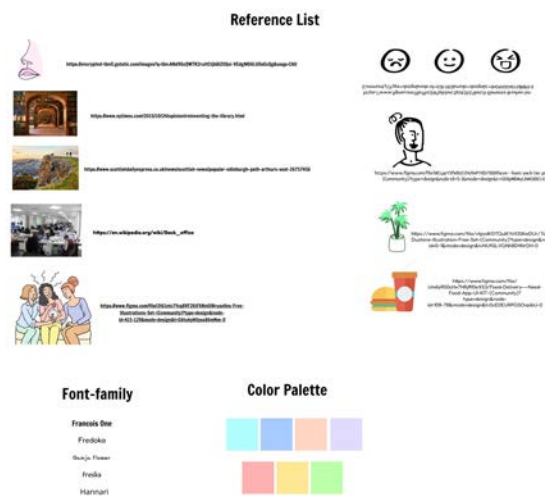


Figure 3.16 Reference Board

Visuals

In the context of scent-based information and odor memory-sharing applications, the visual design concept aims to support user customization and create a clean and refreshing interface. To provide a comfortable user experience, the application's design avoids excessive functional modules and buttons, reducing complexity and cognitive load for the users. The background color of the pages is composed of the theme colors extracted from the content recently shared by the user, enhancing personalization and a sense of connection with their own memories.

Regarding the color scheme, a predominantly light color palette is adopted to create a relaxed and gentle visual effect. The use of soft hues helps to establish a soothing and pleasant ambiance that aligns with the theme of scent-based information and odor memory. By employing gentle tones, the application can evoke a feeling of relaxation and enjoyment that resonates with users' positive associations with odor memories.

Furthermore, the application design emphasizes personal experience rather than social attributes. It focuses on the users' individual perception and recollection,

providing a private space for them to delve into and share their olfactory experiences and odor memories. By reducing the prominence of social features, the application directs attention toward personal sensations and interactions, offering a more personalized and focused experience.

Functions

Odor Description



Figure 3.17 Login Page

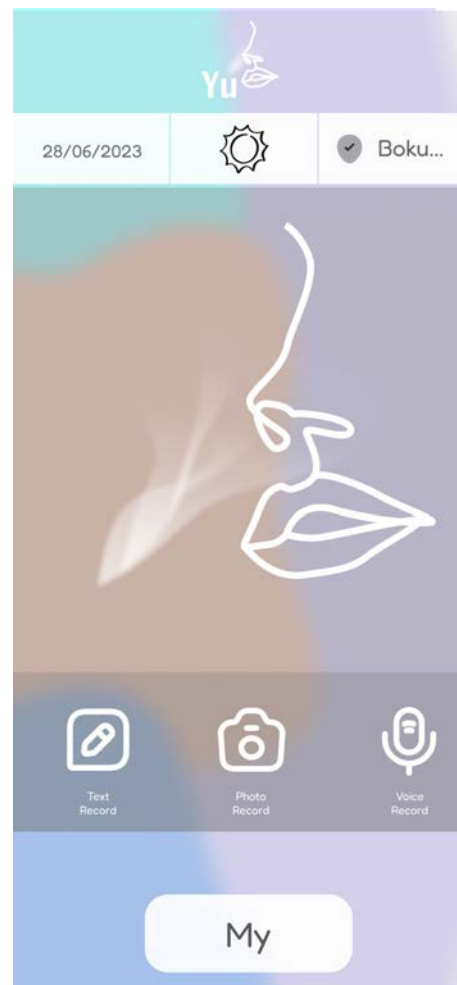


Figure 3.18 Homepage

The application provides users with the capability to record meticulously and vividly describe various aspects of scents. Users can conveniently capture and ar-

ticulate not only the characteristics of the scent itself but also its intricate details, such as its source, origin, and context in which it was experienced. Furthermore, users are able to express the emotional and mnemonic associations triggered by the scent, sharing the profound connections between the olfactory stimuli and their personal memories or feelings. The application's interface also facilitates the comprehensive documentation of scent-related information, enabling users to provide nuanced and evocative descriptions that encompass the sensory, experiential, and emotional dimensions of the scents they encounter.

Multimedia Support

The application incorporates map and location functionalities, allowing users to geotag their sensory experiences of scents in different locations. Users can mark their perceptions and associated memories of scents on the map, serving as both a repository of olfactory memories and a navigational tool. This integration of map and location features enhances the user's ability to associate scents with specific places, facilitating spatial context and geographical references within the application.

Furthermore, the application enables users to augment their descriptions of scents by uploading images, audio, or videos that are relevant to their olfactory experiences. This multimedia support enhances the richness and depth of information sharing, enabling users to provide a more comprehensive and immersive portrayal of the scents they encounter. By visually and audibly complementing the textual descriptions, users can convey a more holistic representation of their olfactory encounters, allowing others to better understand and appreciate the sensory dimensions of the shared experiences.

User Customization Options

The application also offers personalized settings, enabling users to customize various interface aspects to align with their preferences. Users can modify the interface style, choose their preferred theme colors, and personalize their profile information. This customization feature empowers users to create a visually tailored experience that resonates with their individual tastes and aesthetics.

Moreover, the application's background can be derived from the user's personal information archive and usage history. Taking the example of the color palette displayed on the page, if the user's previously uploaded information contains tags

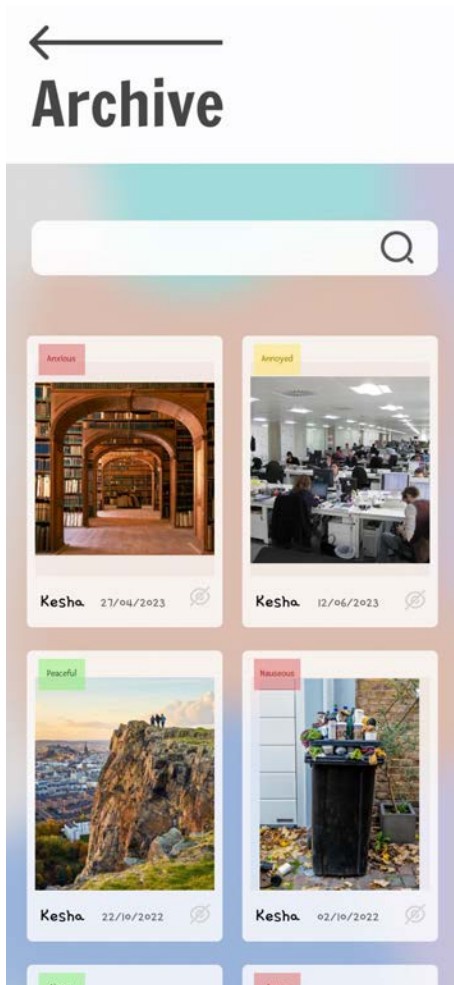


Figure 3.19 Personal Archive

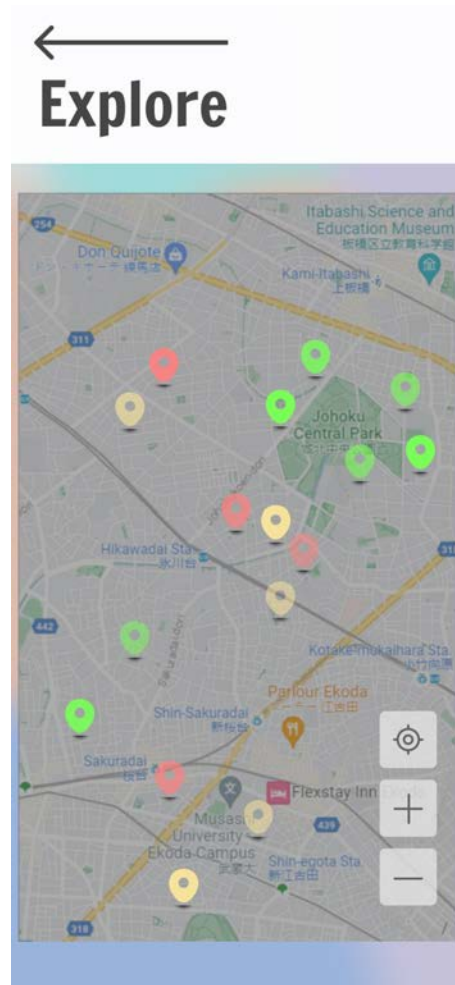


Figure 3.20 Map and Pin

and content with shades of orange, mint green, and purple, the system can generate a visually pleasing composition of desaturated mixed colors. This composition aims to reflect, to some extent, the emotions and thoughts triggered by the user's recent olfactory memories. It is important to note that individual interpretations of colors carry subjective elements. Therefore, the presented results may not fully align with the conventional connotations and symbolism associated with colors.



Figure 3.21 Login Page

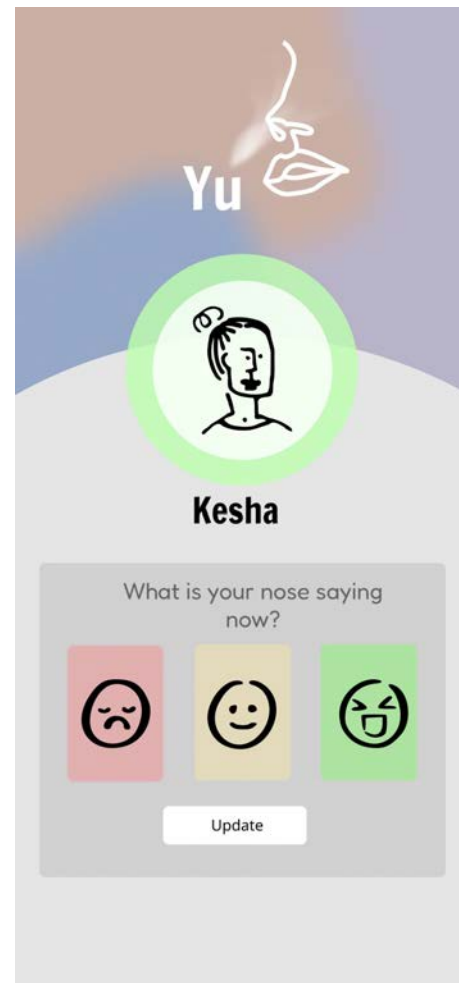


Figure 3.22 Homepage

By providing these customizable options, the application acknowledges the importance of individual preferences and aims to create a user-centric experience. Users can tailor the interface to their liking, fostering a sense of ownership and

personalization within the application, ultimately enhancing user engagement and satisfaction.

Social Sharing and Interaction

Based on the responses obtained from an initial survey, it was revealed that a lot of participants expressed interest in exploring and experiencing location-specific events described by others in relation to scents. This finding highlights the potential for social interaction among acquaintances within the application. Friends can share their scent-related memory archives or location coordinates, fostering a sense of connection and facilitating social engagement.

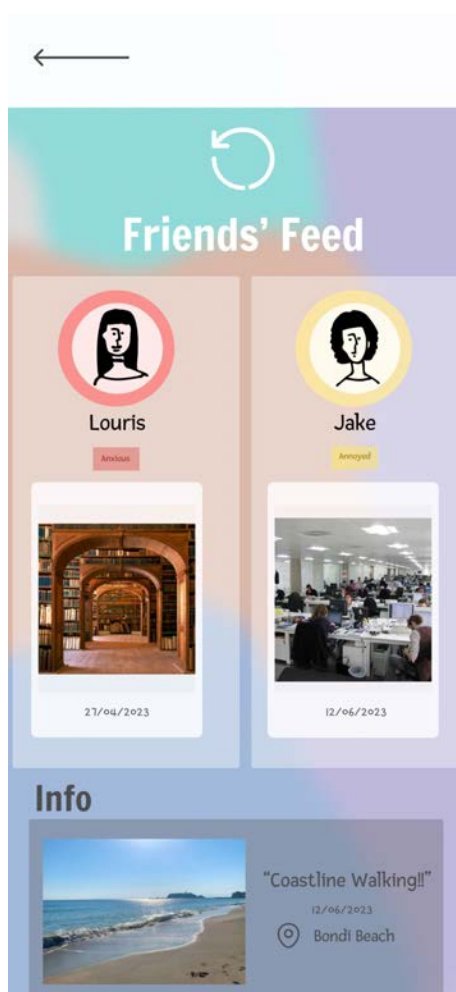


Figure 3.23 Feed



Figure 3.24 DM Function

In line with this, the application incorporates features that support social sharing and supporting social sharing and user interaction share with their scent memories and associated information, allowing others to browse and explore their shared content. This promotes a sense of community and enables users to connect based on shared olfactory experiences. Furthermore, users can participate in social interactions by leaving comments, expressing likes, or sharing the scent memories and information with others.

By facilitating social sharing and interaction, the application creates a platform for users to connect, exchange ideas, and build relationships based on their interest in scents and scent-related memories. This aspect adds a social dimension to the application, fostering a sense of community and enhancing the overall user experience.

Tagging and Categorization

The application provides a tagging or categorization module containing various categories related to scents or scent-induced memory triggers. This feature lets users find their favorite scents and narratives intuitively and effortlessly.

By allowing users to add tags or categories to scent information, the application facilitates better organization and retrieval of relevant content. Users can assign relevant tags or select appropriate categories for their scent-related information, such as weather, mood, places, or relationships. This categorization system enhances the search and browsing experience, allowing users to filter and discover scent memories that match their preferences or interests.

The Tags or Categories module serves as a valuable tool for users to create a personalized catalog of scent-related memories. It lets users easily browse their collections and retrieve specific scents or scent-induced memories based on their desired criteria. In addition, this feature also facilitates content discovery and exploration, as users can browse and explore scent memories shared by others based on different tags or categories. It enables users to personalize their scent profile and facilitates seamless retrieval of information that resonates with their olfactory preferences and stories.

Privacy and Security Protection

Ensuring the privacy and security of users' personal information and shared content is paramount. The application incorporates strong privacy measures to

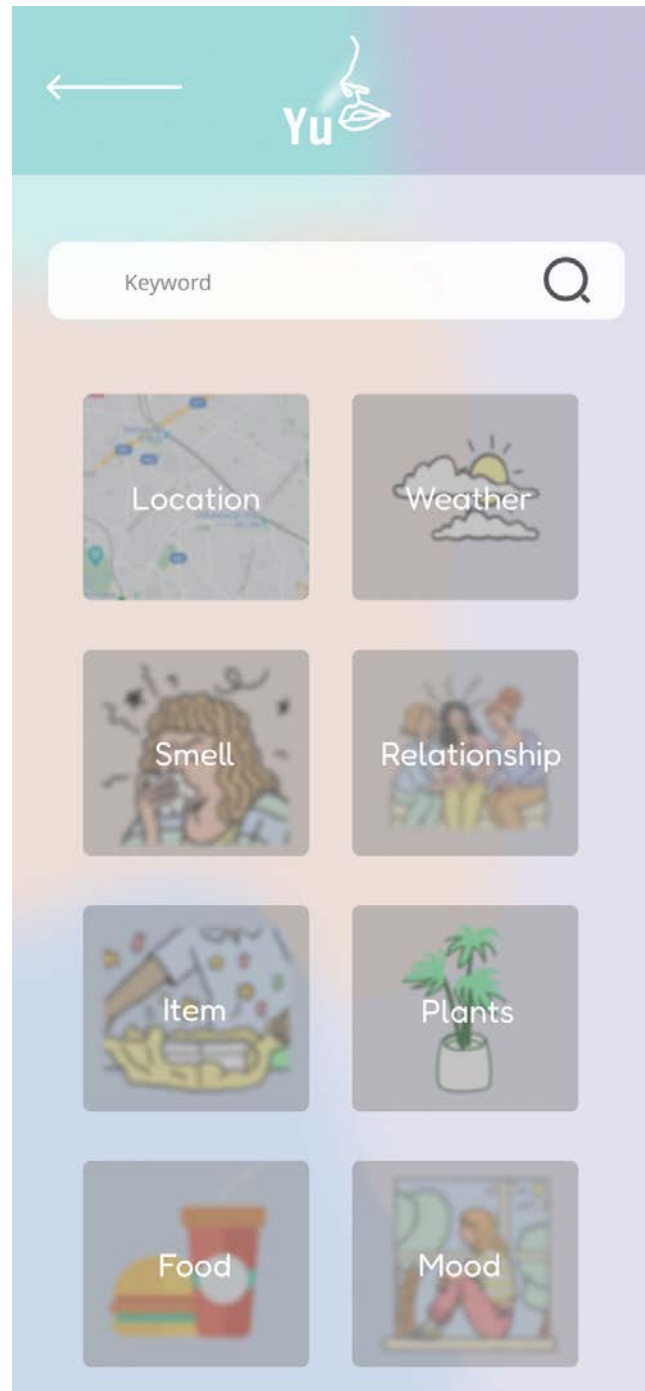


Figure 3.25 Search and Categories

protect user data. It offers comprehensive privacy setting options that give users full control over the visibility of their shared content in the application.

Users can selectively choose the visibility settings for their shared content, deciding who can access and view their scent memories, descriptions, and associated media. They can make their content visible to the public, limit it to their approved friends or connections, or keep it private for personal reference. These customizable privacy settings allow users to tailor their sharing preferences to their comfort level and desired audience.



Figure 3.26 Friend Request



Figure 3.27 Hide the Post

In addition, the application provides the ability to manage friend requests, allowing users to accept or decline friend invitations. This ensures that users can connect with known individuals and maintain a trusted network within the application. The application minimized the risk of unauthorized access to personal information and shared content by allowing users to control their connections.

With these privacy settings and friend management features, the application emphasizes user autonomy and privacy control. Users can confidently share their fond memories and engage in social interactions in a secure environment, knowing

they have the ability to manage their account visibility and control who has access to their shared content.

3.4.5 User Test

The user tests were designed to evaluate the user experience and functional usability of the scent-based information and scent memory-sharing application. The following is the detailed process of the test:

Number of participants: 6 participants

Based on the implemented questionnaire survey, the willingness and connection to scent sharing are temporarily not considering factors such as gender and geographic location. The purpose of this decision is to initially focus on understanding the general user perceptions and experiences related to scent-based information and scent memory sharing, without introducing potential biases associated with specific demographic factors.

By excluding factors like gender and geographic location from the analysis, the aim is to gather broader insights and evaluate the overall user preferences and behaviors toward scent sharing. This approach allows for a more general understanding of user needs, motivations, and satisfaction levels regarding the application's features and functionalities.

However, it is important to acknowledge that gender and geographic location can influence individual preferences and experiences. In future studies or analyses, it would be valuable to explore the potential impact of these factors on scent sharing and consider any variations or patterns that may emerge across different demographic groups.

By conducting the survey without considering gender and geographic location at this stage, the focus is primarily on obtaining initial insights into the user experience and functional usability of the scent-based information and scent memory-sharing application. This can provide a foundation for further investigations and considerations in future research.

Test duration: Two weeks

Experimental tasks for the first week:

1. Participants were instructed to select any photo within the application during the first week and provide a free description of the photo without any content

restrictions. They were encouraged to describe the scenes, people, and emotions depicted in the photo.

2. Participants were required to post the photo along with its description in the application and tag the photo with relevant information.

3. Within three days of posting the photo, other participants were asked to retell the information associated with the photo. They were encouraged to recall details of the photo, emotions, or memories associated with it.

Experimental tasks for the second week:

1. Participants were asked to share the memory that they most strongly associated with a specific scent during the second week. They were instructed to provide a detailed description of the scent memory and the extended feelings associated with it, recalling as many details as possible and crafting a narrative. They were also asked to mark relevant information, such as the coordinates of the location associated with the memory.

2. Participants were required to post the description of the scent memory in the application, along with the relevant markers and information.

3. Within three days of posting the scent memory description, other participants were asked to retell the information associated with that scent memory. They were encouraged to recall the odors, emotions, or other associations linked to it.

Additionally, participants were asked to assess their self-narratives and the completeness of their content elaboration for the odor-indexed memories using a 5-point scale. Since it was not possible to simulate features like anonymity mechanisms and secret accounts in the experiment, participants were also asked to provide additional feedback on the following aspects:

- Satisfaction with their narratives
- The extent to which they received information from other participants
- The level of detail in their recall content in response to different prompts
- Satisfaction with the functionality of the application
- Desire to share olfactory memories
- Approval of olfactory memory sharing as a means to regulate mood
- Interest in the olfactory memories shared by others

The above information was collected through questionnaires and interviews to refine the content framework and investigate potential effects and factors that

may facilitate recall effects.

Information Sharing

To visually demonstrate the indexing role of olfactory clues in narrative and memory, the content-sharing process was conducted anonymously. Instead of presenting the content achievements in stages, a comparative analysis was performed between the submissions and descriptions of the same participant in two different stages.

By ensuring anonymity, participants were encouraged to freely express their scent-related experiences and memories without concerns about identification or judgment. This approach aimed to create a safe and open environment for participants to share their personal narratives and memories associated with scents.

To highlight the indexing effect of olfactory clues, the focus was on comparing the content and descriptions provided by individual participants in two distinct stages. This approach allowed for a direct examination of the impact of scent on the narrative and memory recall processes. By contrasting the participants' submissions and descriptions between the two stages, it was possible to identify any variations, enhancements, or evocations of scent-related details and emotions over time.

This methodology aimed to provide a comprehensive understanding of how scent acts as an index in the storytelling and memory retrieval processes, allowing for an exploration of the potential connections and associations between scents and personal experiences. By analyzing the submissions and descriptions within the same individual, the study aimed to reveal how scents contribute to the richness and depth of narrative and memory, offering insights into the role of olfactory cues in shaping personal narratives and memories.

Participant A

Week 1: It was a bar with some fruity smells that piqued my curiosity.

Week 2: When I went hiking after the weekend rain, the air was filled with the fresh smell of grass and trees, and it smelled like my throat felt sore, and my mood was pleasant and relaxed.

Participant B

Week 1: My mother raised roses. Roses are the kind of roses that help farmers



Figure 3.28 A Week 1



Figure 3.29 A Week 2



Figure 3.30 B Week 1

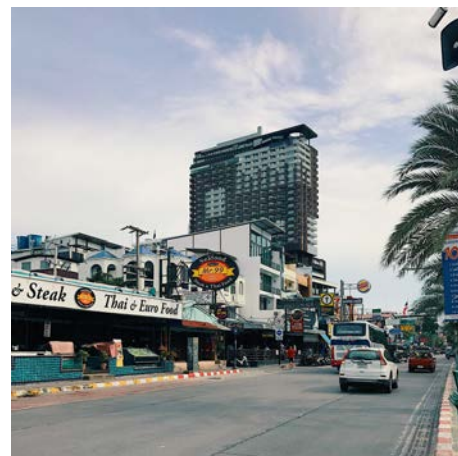


Figure 3.31 B Week 2

in Yunnan that were purchased on the net before 20 a dozen, very fragrant rose flavor.

Week 2: Thailand's Pattaya coastline at mealtime with the sun out looking for food Pattaya many Indian restaurants at mealtime with the smell of curry but the fragrance of food will be covered by the smell of the tail of the huge number of vehicles coming and going on the road. Still, head to the right will immediately smell the salty taste of seawater brought by the sea breeze.

Participant C



Figure 3.32 C Week 1



Figure 3.33 C Week 2

Week 1: When I returned from my winter internship, I lived in a relative's house, an old house in Beijing with a dull smell of wood and moldy books mixed. The bubble mart bought from the Haidian Huangzhuang subway station vending machine was the only decoration belonging to me in that house.

Week 2: A store called Flovie, the store is decorated in a style that matches the name, there are many flowers, probably in this atmosphere ordered a cup of Red Rose Latte that I would never normally order. The rose fragrance is particularly strong, like eating flowers. I went in on the spur of the moment, but here I made an appointment to explore all the brunch stores in Melbourne, so I was very excited and happy.

Participant D



Figure 3.34 D Week 1



Figure 3.35 D Week 2

Week 1: Very excited! The skis I've been choosing for a long time arrived as a birthday gift from my girlfriend. It is my favorite blue color.

Week 2: At home, the mood relaxed a little from the tension and worry because just bathed the kitty. He was very uncooperative in blow-drying and could only wrap it up. The cat was dry with the smell of body wash, a little bit of his own saliva and cat body odor, and some dusty smell of the electric blanket.

Participant E



Figure 3.36 E Week 1



Figure 3.37 E Week 2

Week 1: Last summer, I watched Enoshima from the sea in Kamakura, and the salty, sandy, sticky flavor of the sea, it was very sunny.

Week 2: An essential oil store in Hong Kong, a variety of perfume flavor mixes, there are big-name perfumes and hotel perfume flavors of affordable alternatives. I was able to smell the Chanel No. 5 perfume, but the price here is much lower, and the owner speaks Mandarin.

Participant F

Week 1: In Florence, feel happy and want time to stop.



Figure 3.38 F Week 1

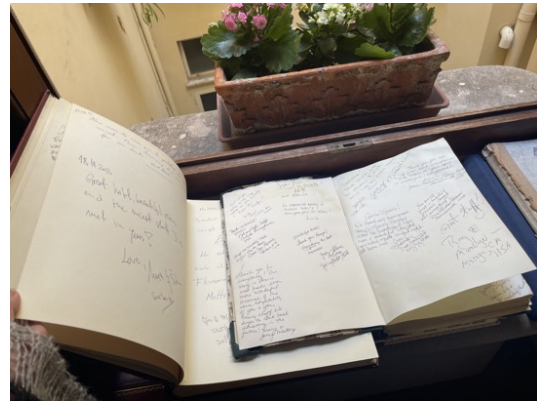


Figure 3.39 F Week 2

Week 2: In an old house, the guestbook on the desk is opened with messages from previous residents, there is the smell of damp wood, and the smell of decaying paper, and the smell of laundry detergent that just washed the room sheets floating in the air, feeling a little scared and looking forward to it.

Result Analysis

Four participants missed a week each during the testing process, which prevented the content from being compared, but they still participated as respondents in the final user testing questionnaire as they were involved in the whole process and received information from other participants.

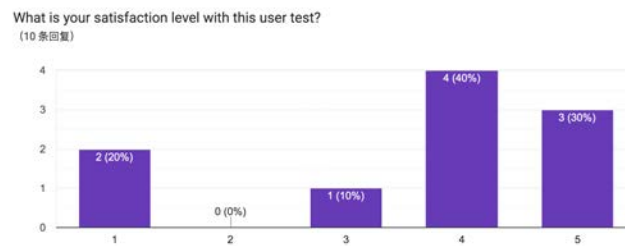


Figure 3.40 Result: Satisfaction Level

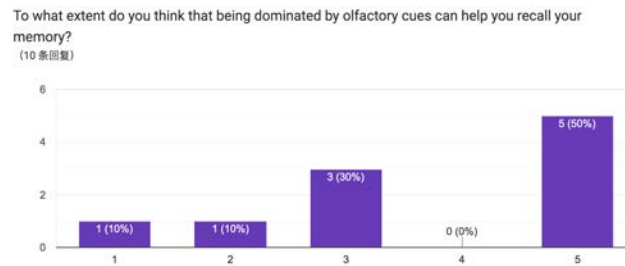


Figure 3.41 Result: Olfactory Cues

The results showed that 80% of the ten participants rated the level of satisfaction as moderate and above. Half of the participants experienced olfactory cues as useful for recall during the test. And half of the participants felt that the olfactory narrative had an excellent (>80%) impact in helping them construct their recall during the olfactory narrative.

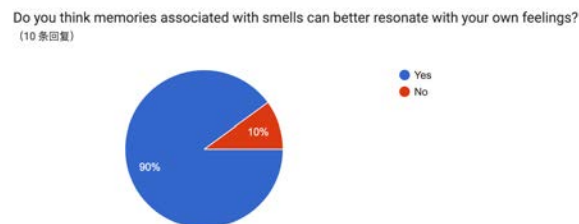


Figure 3.42 Result: Memories evoked

From the figure, it is worth mentioning that 90% of the respondents agreed that olfactory narratives could resonate with them.

“I was very impressed with the beach photos, and although we haven’t been to the same places, I have had the experience of smelling curry on the beach. It made me very nostalgic for my travels, and I was fascinated by their photos.”

“I also love hiking, and natural scenery can make me feel relaxed. I also like to use fragrances close to natural scents to help me relax my mind, but I didn’t realize before that I could get more involved in the memories of climbing when I

smelled grass and trees.”

To further understand the respondents’ feelings about olfactory narratives and their willingness to share their personal olfactory memories, the questionnaire yielded the following results:

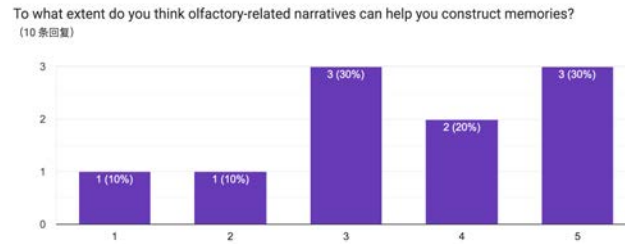


Figure 3.43 Result: Construct Memories

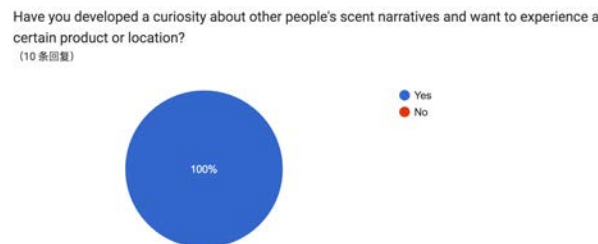


Figure 3.44 Result: Curiosity

When the respondents were asked to what extent olfactory narratives helped them to construct memories, 80% of them chose to help to a greater extent, and even 30% believed that olfactory narratives could be very good at helping them to form and refine memories, even if they were narrated by other people because similar olfactory memories they possessed could help them to enrich the details of their memories and deepen their impressions. Therefore, when asked if they were curious about other people’s odor narratives, all respondents chose the positive answer.

“I think the olfactory narrative in the second week helped me to better recall the details in the photographs compared to the lack of olfactory cues described in the first week. ”

“When making memories of the week’s photos, I had a hard time remembering the stories behind the photos. ”

“What I remembered most from the second week was the photo of the kitten; the description of the smell of the cat after the bath was so interesting. The smell of the cat’s saliva and the blanket were smells that I couldn’t find any substitutes for. It smells that only someone who has owned a cat would understand, reminding me of the cats I used to have. ”

“I’ve also been to that essential oil shop in Hong Kong, and the wonderful thing is that I had forgotten my memories of traveling at the time, but the owner of the photo mentioned the Chanel No. 5 perfume scent, and I was immediately dragged back to the summer afternoon a few years ago. ”

“The photo of the bar provided by one of the participants in the first week looked interesting, but only the fruity smell was mentioned. It would have been nice to have a more detailed account of what fruit smell it was. If it had been my personal favorite, peach or grape, I would have been happy to spend time in that bar! ”

The feedback reveals that when participants were asked to engage in scent-related narratives, they demonstrated a heightened ability to recall vivid details, engage multiple senses, and provide comprehensive descriptions from various perspectives, capturing the emotions, signals, and personal reactions associated with the scents. Their narratives showcased a high level of sensory richness, enabling a deeper understanding of the contextual mood and the participants’ personal responses to the scents.

As the participants were fully aware of the application’s functionality, user interfaces, and operating procedures, they understood and agreed that all relevant images provided would be used as posts by the application users in practice. The survey also asked about the users’ willingness to share and whether they were satisfied with the privacy features of the existing design.

According to the responses, 90% of the respondents were willing to share their olfactory memories (including but not limited to words, pictures, places, and any

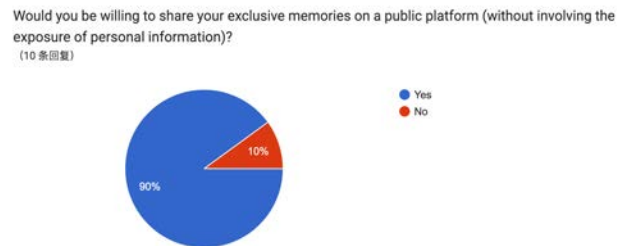


Figure 3.45 Result: Willingness to share

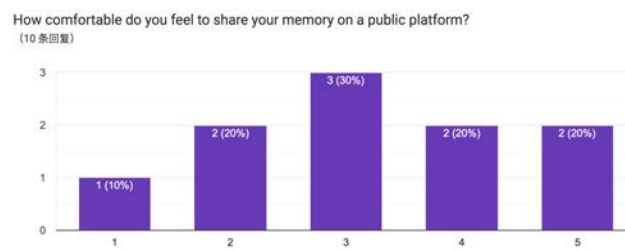


Figure 3.46 Result: How comfortable do you feel to share the contents

related information) on a public platform without compromising their privacy. However, when respondents were asked 'How comfortable do you feel to share the contents?', the results reflected a more pronounced preference. However, when respondents were asked, 'How comfortable do you feel to share the contents?', the results reflected a more pronounced preference.

In addition to one participant who explicitly stated that she did not feel comfortable posting her olfactory recollections on a public platform, two other interviewees demonstrated a more negative willingness to share, having previously selected 'willing to share.' In separate interviews with these two respondents afterward, they indicated that the application could be further refined in terms of the partitioning of content visible to users. They wanted to be able to be more specific about the content-visible groupings. The participants also mentioned the introduction of location tags, where a user's activity can be reflected in the application, and how to distinguish between public location tags visible to everyone and those visible to specific subgroups is also something they would like to see emphasized. This insight reveals that user privacy needs to be further enhanced in the design of this application, as olfactory memory is often associated with people's personal experiences [34].

The research results demonstrate that scent-based storytelling and olfactory information can effectively activate individuals' senses and elicit psychological responses. Participants' ability to recall details, visualize scenes, and express a willingness to explore the depicted locations further underscores the potency of scent as a narrative tool and the impact of olfactory information on individuals' perceptions and experiences. This highlights the potential of scent-based narratives to enhance engagement, evoke memories, and foster a deeper connection between individuals and their surrounding environments.

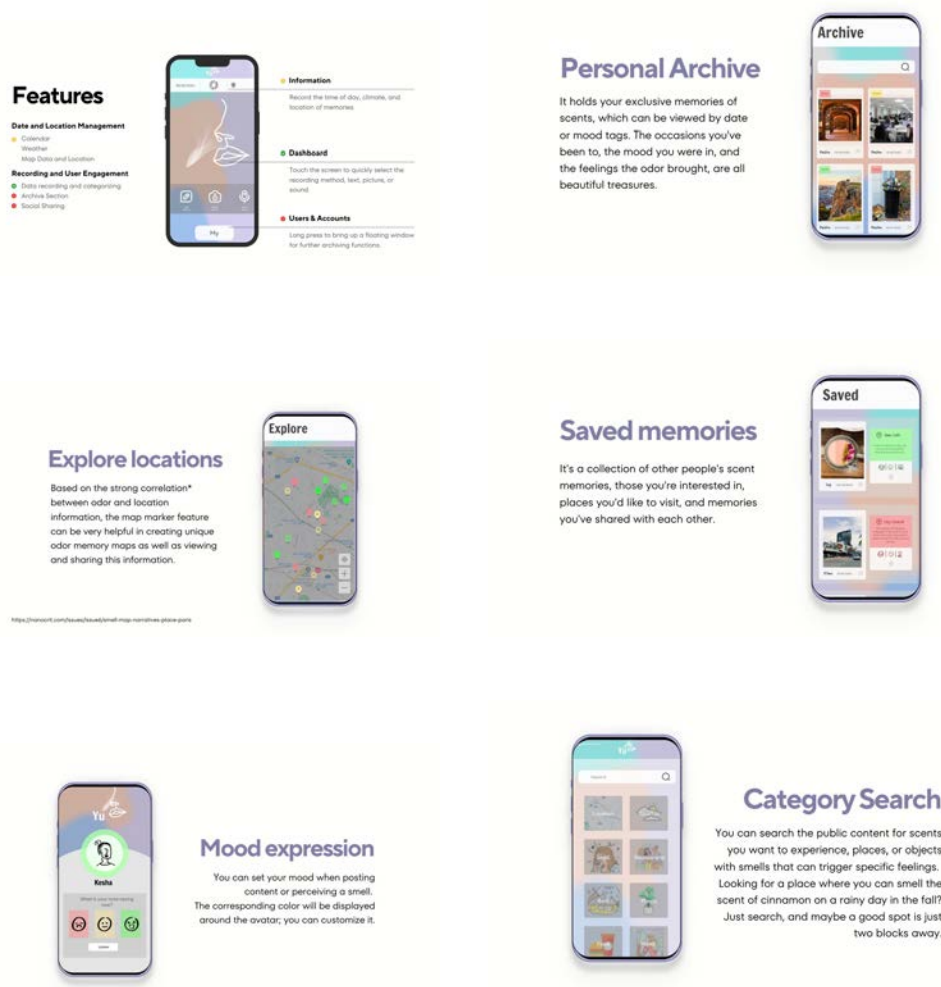
3.4.6 Online Simulation Test

Designing the online presentation

To collect more participants' experiences and opinions about this application in actual practice on a daily basis, the online simulation test can compensate for the limitation of the number of users in the user test and show the complete use process

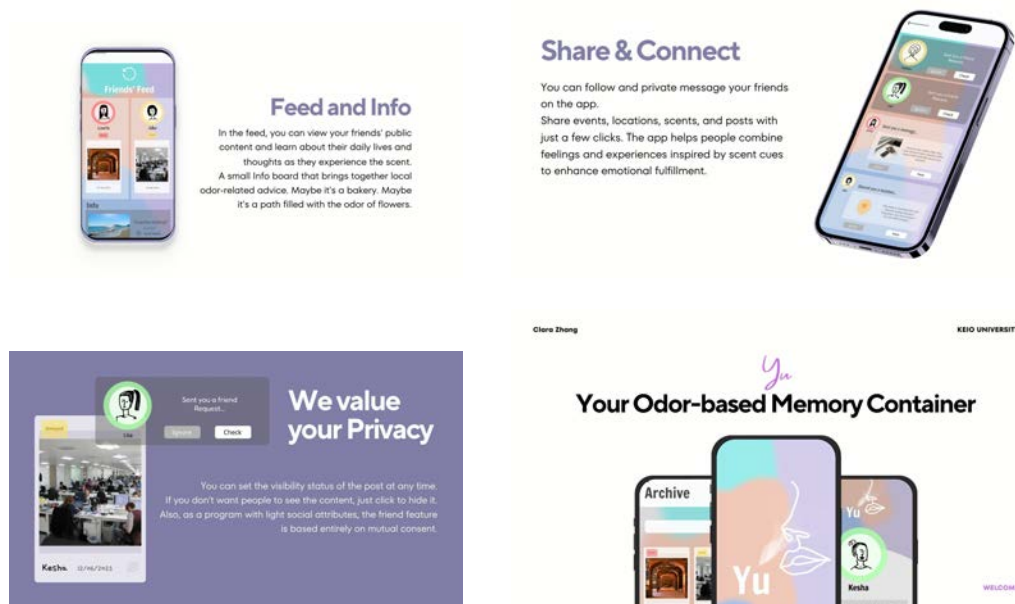
and function demonstration by presenting the content collected in the user test. The online presentation consists of a short video that explains in detail the user page, functional partitions, usage, and content layout of the application. After watching the entire video, respondents were asked to complete a questionnaire based on their experience.

Video Screenshots



Designing the Online survey

Based on the results of the user testing and interview summaries, and after careful study of the questions and responses, a short online questionnaire consisting

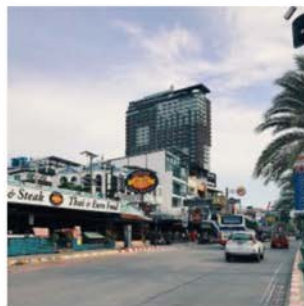


of 12 questions was released via social media (WeChat and Instagram), with an approximate time required noted in the introduction. The complete questionnaire can be found in Appendix D. The online survey questions were constructed quantitatively to ensure accurate data collection. For example, in the questions, participants were shown the post's content captured during the user testing session, a narrative about the user's odor-evoked memory, and a relevant photo. The questions were designed to ask respondents how much they felt about the odor-evoked memories of others, so the answers were also designed to be on a 5-point Likert scale. For example, the answers to this sample question follow each statement with options ranging from 'strongly disagree' (1) to 'strongly agree' (5), and respondents' perceptions are analyzed through their answers.

Data collection and feedback

A total of 48 valid responses were received for the online mock test. Participants were optimistic about the application after watching the simulation video and showed a desire to learn more about it. The participants' preference was also reflected at the end of the survey. The result indicates that 89.58% of the participants, after learning about the features of the questionnaire and evaluating

*8. Please read the following olfactory narrative and choose your answer:
Thailand's Pattaya coastline at mealtime with the sun out looking for food Pattaya many Indian restaurants at mealtime with the smell of curry but the fragrance of food will be covered by the smell of the tail of the huge number of vehicles coming and going on the road. Still, head to the right will immediately smell the salty taste of seawater brought by the sea breeze.



1	2	3	4	5
Olfactory narrative helps me to memorize the content of this photo				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narratives can evoke empathy and similar memories for me				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narrative makes me curious and interested in the location				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narratives bring the shared memory to life				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narrative makes me want to share the post				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 3.47 Example question

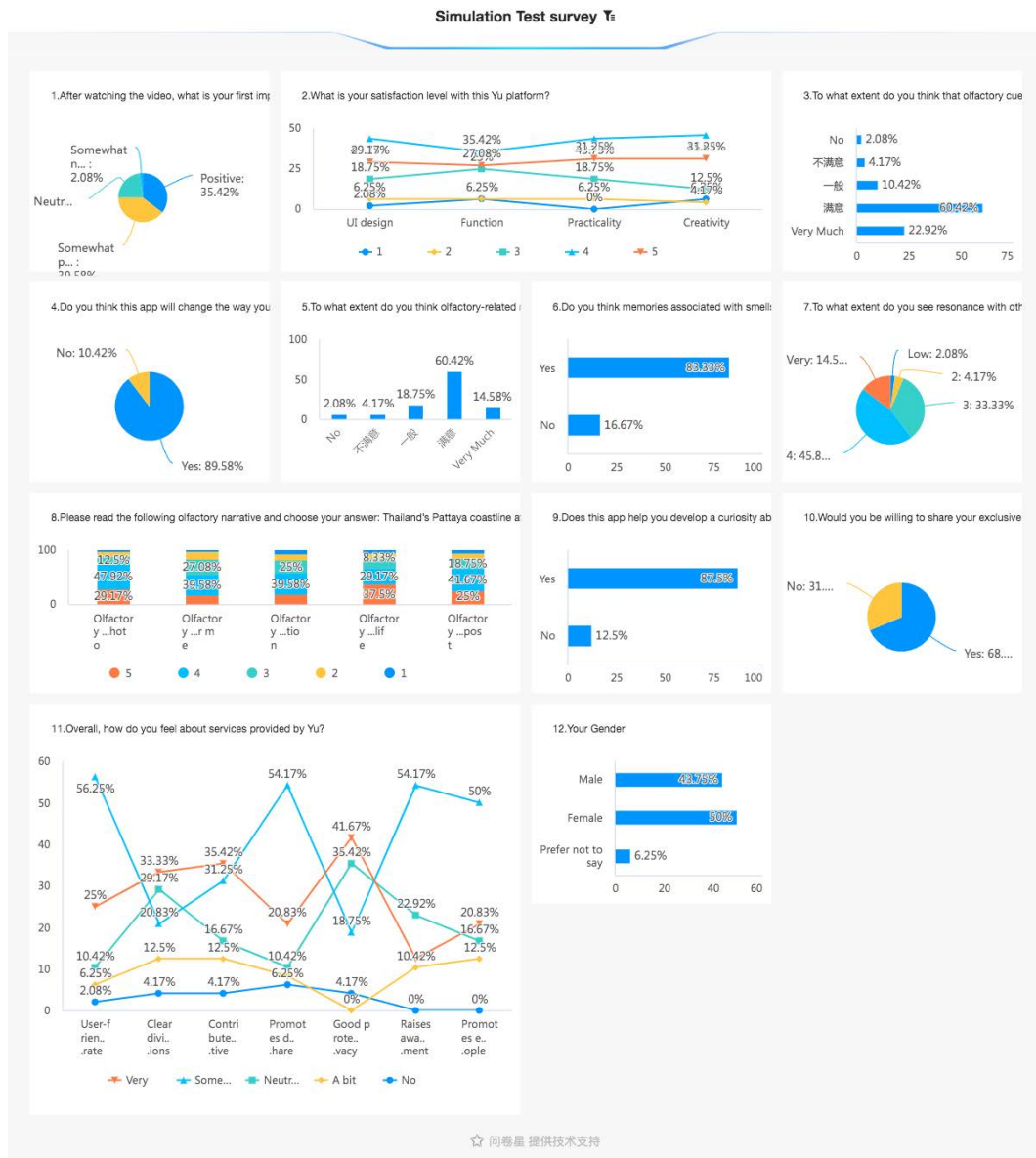


Figure 3.48 Simulation Test Survey

the content, felt that the application would help change how they recorded their memories.

When respondents answered the sample questions, they each chose the option that best matched their own experience. Taken together, the mean score of this scale was 3.7, indicating that many people were neutral about the effect of olfactory narration. At the same time, the olfactory narrative was more effective for memorization, shared memory, and desire to share.

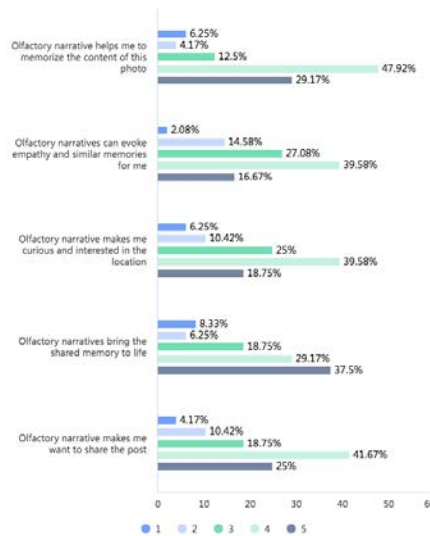


Figure 3.49 Answer of Example Question

Further, in order to investigate the relationship between product design and user experience, the following table uses correlation analysis to investigate the correlation between the “elements of product design” and the “different experiences of users”, and the correlation coefficient is used to express the correlation.

Respondents’ comments based on user pages and product features point the way to further product improvements. From the statistics of the results, it can be seen that users have a more positive attitude towards the services provided by Yu on the whole. The average score is 3.8, which indicates that users are highly satisfied with Yu’s services as a whole.

In terms of user-friendliness and ease of use, the majority of users (56.25%)

	UI design	Function	Practicality	Creativity
User-friendly and easy to operate	0.463**	0.093	0.379**	0.562**
Clear division of functions	0.476**	0.527**	0.388**	0.487**
Contributes to olfactory narrative	0.192	0.278	0.247	0.137
Promotes desire to share	0.429**	0.044	0.449**	0.054
Good protection of customer privacy	0.363*	0.351*	0.293*	0.394**
Raises awareness of the living environment	0.339*	0.128	0.147	0.253
Promotes emotional resonance between people	0.267	0.308*	0.079	-0.124

* $p < 0.05$ ** $p < 0.01$

Figure 3.50 The correlation between product design and user experience

found Yu's services relatively friendly and easy to use. Similarly, 54.17% of users believe that Yu's service can promote the desire to share, while 54.17% of respondents believe that Yu's service can raise awareness of the living environment. In addition, half of the participants said that the services provided by Yu promote emotional resonance between people and provide a platform for emotional communication. However, it is important to note that, as in the feedback received in the user test, only 33.33% of the respondents considered Yu's services to be functionally clear. This indicates that there is still much room for improvement in the functional division of the product. In terms of protecting customer privacy, a relatively high percentage of users (41.67%) believe that Yu is able to protect customer privacy well.

Feedback

These are some of the qualitative insights from the respondents. The vast majority of people were interested in an application that has no alternatives on the market, while some provided good suggestions and pertinent feedback on the product's features based on their own daily usage habits. "I think the application is interesting, and although I don't know what it can do when it's actually put into use, I'm looking forward to creating my own olfactory map!"

"I like the search function best because I like to be in a pleasant odor environment."

"This application can be bookmarked as a secret place! I'm going to mark a route where I can smell the flowers in the cinnamon season."

"The private messaging feature is great. I love Yu's function, that I can communicate directly with my friends."

"It would be nice if it could be more user-friendly. I don't see the need for this

application at the moment, but it's certainly interesting to try.”

“The more I take off my mask, the more I realize how precious my sense of smell is and how wonderful it is. I hope Yu will help more people to record their olfactory memories.”

“Through this questionnaire, I realized that many of my memories are actually closely linked to smell, and answering the survey brought back memories of playing on the beach, which was a happy time.”

User testing and online mock-ups only provided a glimpse of the conceptualization of the application, but the positive feedback from the participants provided a direction for its refinement. At the same time, the purpose of the design was realized, namely to evoke the importance of olfactory memory and the resonance of olfactory narratives.

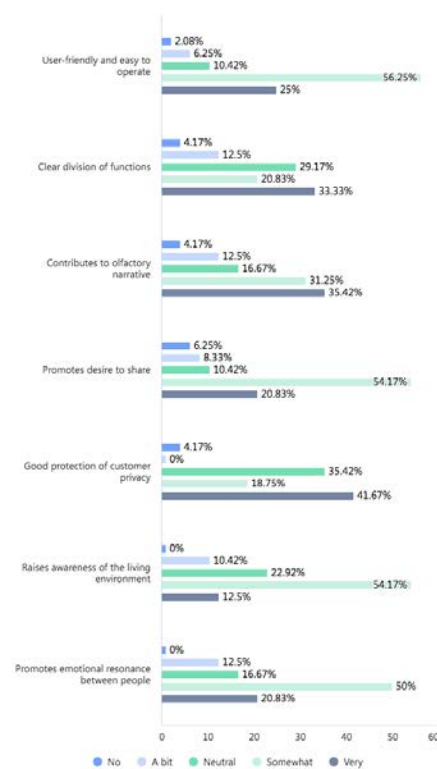


Figure 3.51 Overall evaluation

Chapter 4

Conclusion

4.1. Main findings

The sustainability and transferability of odor-evoked memory were exemplified through the first phase of the design and experiments. The environmental odors preserved through the physical KIT can help people retain memories to a greater extent. Some individual respondents indicated that they did not feel any difference in the information obtained through the field-collected odors, but it is worth affirming that for most of the respondents, the information conveyed by the odors mainly compensated for the lack of visual and verbal communication, while the olfactory narrative also had a strong emotion-evoking effect and aided memory retention. This led directly to the second phase of the research on the online platform.

And the questionnaire results are consistent with the previous findings of other scholars that odors affect people's psychology, and even the textual cues extracted from odors affect people's behavior and decision-making [1]. Therefore, during the subsequent second design and testing phase, innovation and research shifted from verifying odor-evoked memory to discussing the transferability and reconstructability of olfactory cues and odor recall. During the design process, the authors added feedback features about the psychological aspects of potential users, such as color borders and mood markers. During the study, it is verified that olfactory cues trigger more personal memories and more comprehensive sensory perceptions to a certain extent. This also leads to the need for further attention to the product's privacy.

4.2. Future application

For the first stage of design, the meaning of the scent archive package is not only a container for collecting scents but also the people, events, and time and energy spent together that the scent represents. Scents always fade, and some memories are fleeting. But the ability to relive the mood of the moment over and over again within a limited “shelf life” and to recreate a complete and comprehensive memory for the person you want to share is what this kit exists for. The existing materials and preservation devices are based on short-term preservation purposes and have limitations in their application. Also, due to the characteristics of the materials obtained, certain odors may not hold up well and be preserved. A more comprehensive range of applications might exist if more materials could be developed to store scents for different occasions. As some scent devices are used in autism therapy [23] and police use, scent retention is not just a momentary pleasure. It is the purpose of this study if it can be put into medical treatment sessions in the future or as an adjunct to psychotherapy to help patients with calming effects in familiar environments and positive memories triggered by scent. The author is more hopeful that the design of the second stage can be used in the future. The future applications of scent-based information and scent memory sharing hold significant potential for diverse fields.

The following are several potential directions for its utilization:

Travel and exploration experiences

Such applications can enhance the travel experiences of individuals by providing them with a deeper understanding of their destinations. Users can share and explore scent memories associated with different locations, allowing them to discover unique local features such as the aroma of coffee in a particular city or the salty scent of a beach, thereby enriching their travel experiences.

Emotional and mood management

Given the close connection between scent and emotions, these applications can assist users in managing their emotional states. By sharing and recalling memories associated with specific scents, users can document positive or negative experiences and engage in discussions with other users. This interactive process can offer emotional support and foster a sense of resonance, aiding users in regulating their emotions.

Personal development and cognitive enhancement

Scent serves as a powerful trigger for memory recall, evoking deep-seated memories and experiences. Such applications can function as cognitive enhancement tools, helping users develop and enhance their memory capabilities. Users can record personal experiences and information related to specific scents, strengthening memory connections and storage. Through sharing with others, users can also gain new insights and trigger memories from the scent memories of others.

Social interaction and collective memory

Scent-based information-sharing applications can facilitate social interaction and the establishment of collective memories. Users can share and exchange their scent-related memories, engaging in comments and interactions with other users. This not only strengthens social connections but also contributes to the formation of a shared culture and emotional experience.

Olfactory navigation and environmental awareness

In specific environments, scent can serve as a valuable clue for navigation and environmental perception. By integrating maps and location-based features, such applications can assist users in navigating urban or indoor spaces using olfactory clues. Users can share the scents they encounter in particular locations and mark them on the map, providing navigation references and environmental awareness for other users.

In conclusion, scent-based information and scent memory-sharing applications have the potential to offer immersive, personalized, and socially interactive experiences. They can provide users with rich emotional and sensory experiences while facilitating communication and interaction. As technology continues to advance, these applications will play a significant role in various domains, offering users novel experiences and enhancing cognitive processes.

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Appendices

A. Preliminary Survey

Create yourself a more vibrant and vivid memory through scent

1. From the following senses, which do you think has left the most lasting impressions on you?

Touch Smell Taste Sight Hearing

2. How do you usually choose your perfume?

Buy random perfume just to smell good

Have a strong preference on the base note of fragrances (Floral, woody, citrus, etc.)

To suit the mood of the day or the dress code

Use a perfume that evokes pleasant memories

Other comments

3. Do you think perfume evokes memories of specific moments or scenes for you?

Yes, absolutely! No, nothing coming up to my mind

4. Do you think products with scents are more likely to help you recall the memory of the environment and atmosphere?

Yes No

5. Have you ever purchased a scented product that brings back memories?

Yes No

6. Do you prefer a scent because of an excellent related memory?

Yes No

7. Would you like to receive a souvenir with the scent of a place that holds good memories of you?

Yes No

8. Your gender

Male Female

B. Application Survey

Preference for scented products and their effect on people's memory

1. Your gender:
Male Female Non-binary
2. Your age:
10-20 20-30 30-40 40+
3. Have you ever wanted to keep a certain smell as a memory?
Yes, sure! No
4. Do you have particular memories that are closely related to the odor you smelled at that time? If yes, please share your story shortly! :)
Yes No
5. (If 4 is Yes) If yes, please kindly share your story in a few sentences! :)
6. Have you ever bought a scented souvenir?
Yes No
7. What kind of souvenirs are they?
Sachet Candle Skincare Products Others
8. Do you think the existing fixed-scented souvenirs on the market can help you directly relate to the mood and episodic memory at that time?
 - (1) Nothing
 - (2) Can only remember places and people around
 - (3) Can remember something detailed, like activities and mood during that time
 - (4) Somewhat helpful
 - (5) Can remember almost everything
 - (6) Extremely vivid and clear
9. As a visitor, do you care about the smell of the environment or other people's evaluation related to the smell when choosing a place or scenic spot?
 - (1) No
 - (2) A bit
 - (3) Relatively

(4) Highly

(5) Very

10. Do you think a portable scent archive would help to recall experiences better?

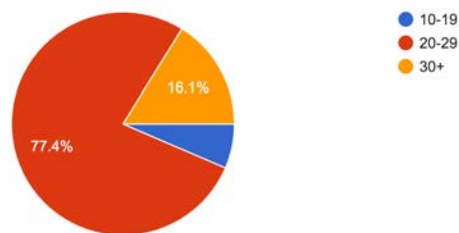
Yes Maybe No

11. Would you like to create your scent archive through 'Yu' for recalling memories or sharing with others?

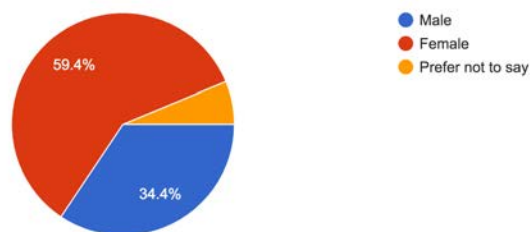
Yes No

C. Initial Survey for the application

Age
(31 条回复)

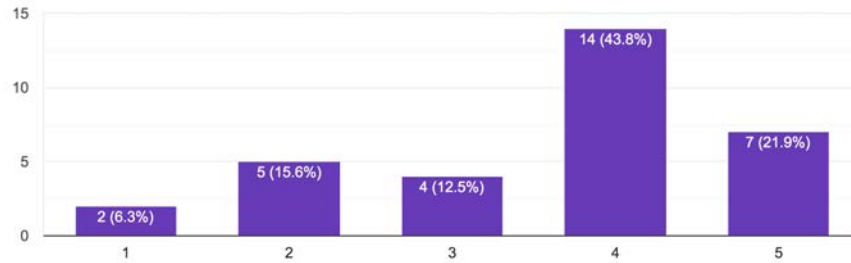


Gender
(32 条回复)



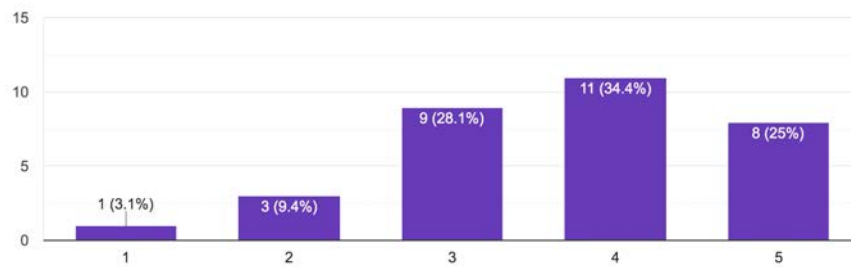
How much do you care about the smell of the environment or other people's evaluation related to the smell when choosing a place or scenic spot?

(32 条回复)



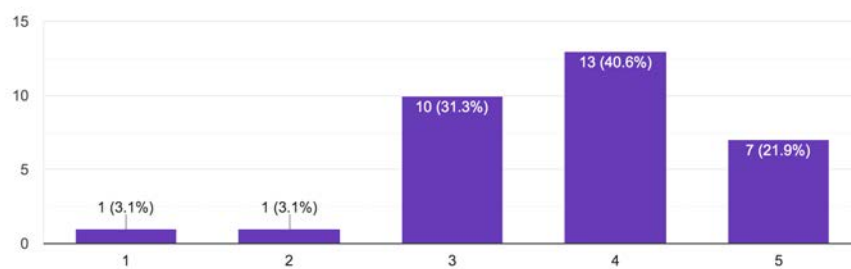
How much do you care about information containing odor-related descriptions?

(32 条回复)

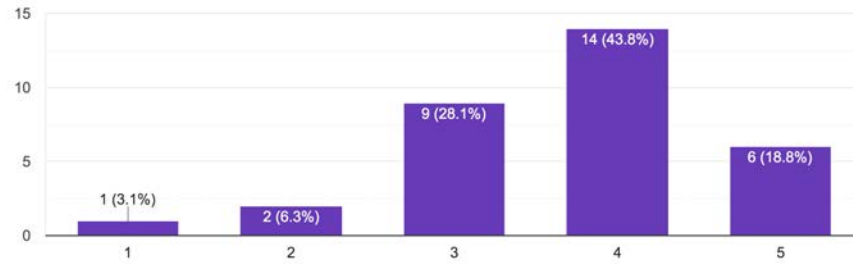


How often do you associate memories with their associated olfactory information?

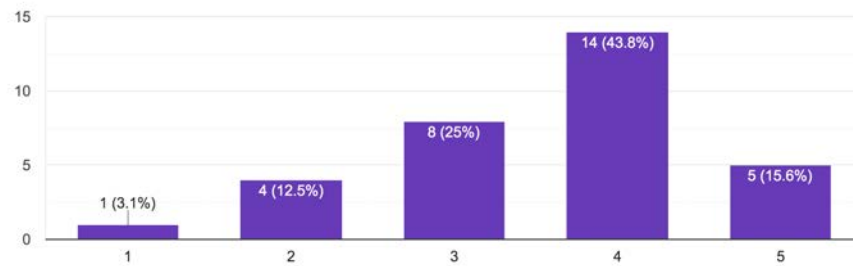
(32 条回复)



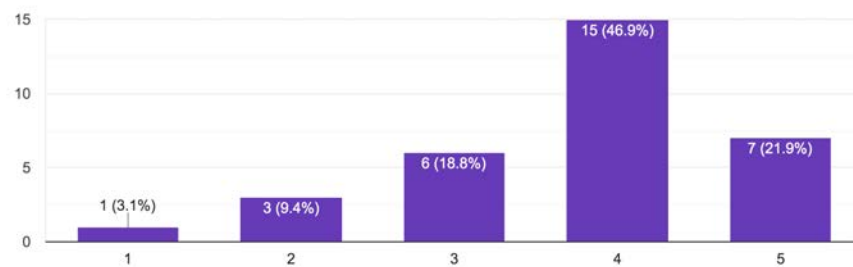
How often do you involve odor information when expressing your memory?
(32 条回复)



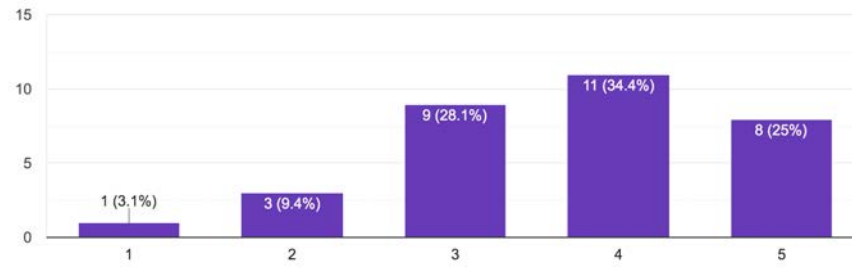
To what extent are you influenced by descriptions of scent information provided by others?
(32 条回复)



Do you agree that the presence of olfactory information and its description assists in recalling memories with greater detail?
(32 条回复)



What is your willingness to share your personal evaluation of olfactory information and odors?
(32 条回复)



D. Online Simulation Survey

Simulation Test survey

Hello, I am the designer of Yu. This is an app designed based on odor-evoked memory sharing. During the pandemic, we have to wear masks, and the loss of sense of smell brought by the sequelae of Covid-19 has made people realize the importance of the meaning of smell. In addition to enriching people's sensory enjoyment, smell's role in helping people memorize should not be ignored. This app can help people consciously record memories related to the sense of smell, archive, and share them.

Clicking on the link, you can see the product description video; please watch it and answer the following questions. https://drive.google.com/file/d/1OeAx9IBqMOT78mGyzq00fEBV712TUq6w/view?usp=drive_link

***1. After watching the video, what is your first impression about this product?**

Positive
 Somewhat positive
 Neutral
 Somewhat negative
 Negative

***2. What is your satisfaction level with this Yu platform?**

	1	2	3	4	5
UI design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Function	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Practicality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*3. To what extent do you think that olfactory cues can help you recall your memory?

No Very Much

① ② ③ ④ ⑤

*4. Do you think this app will change the way you record your memories?

Yes
 No

*5. To what extent do you think olfactory-related narratives can help you construct memories?

No Very Much

① ② ③ ④ ⑤

*6. Do you think memories associated with smells can better resonate with your own feelings?

Yes
 No

*7. To what extent do you see resonance with others' odor narratives?

For example, please read this part.


At home, the mood relaxed a little from the tension and worry because just bathed the kitty. He was very uncooperative in blow-drying and could only wrap it up. The cat was dry with the smell of body wash, a little bit of his own saliva and cat body odor, and some dusty smell of the electric blanket.



Low
①
②
③
④
⑤
Very

***8. Please read the following olfactory narrative and choose your answer:**

Thailand's Pattaya coastline at mealtime with the sun out looking for food Pattaya many Indian restaurants at mealtime with the smell of curry but the fragrance of food will be covered by the smell of the tail of the huge number of vehicles coming and going on the road. Still, head to the right will immediately smell the salty taste of seawater brought by the sea breeze.



	1	2	3	4	5
Olfactory narrative helps me to memorize the content of this photo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narratives can evoke empathy and similar memories for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narrative makes me curious and interested in the location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narratives bring the shared memory to life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Olfactory narrative makes me want to share the post	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***9. Does this app help you develop a curiosity about other people's scent narratives and want to experience a certain product or location?**

- Yes
- No

***10. Would you be willing to share your exclusive memories on a public platform (without involving the exposure of personal information)?**

- Yes
- No

***11. Overall, how do you feel about services provided by Yu?**

	No	A bit	Neutral	Somewhat	Very
User-friendly and easy to operate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clear division of functions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contributes to olfactory narrative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promotes desire to share	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good protection of customer privacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raises awareness of the living environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promotes emotional resonance between people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***12. Your Gender**

- Male
- Female
- Prefer not to say